The
Practical Teacher
A MONTHLY EDUCATIONAL JOURNAL.
Edited by JOSEPH HUGHES.

'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

VOL. XIII. No. 3. SEPTEMBER, 1892. { PRICE, 6D. / POST FREE, 8D.

RECREATIVE BOTANICAL PAPERS.

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VI. SEPTEMBER.

Now the floral year is drawing to a close. Alike in garden and in field and hedge-row, the vivid blossoms of the heyday of summer are giving place to the paler tinted flowers of autumn. But the fields are yellow with golden grain, and from pond and stream we shall be able to study the form and habit of water-plants.

Let us then early in the month begin our field expeditions; and first, let us see what plants we can add to the orders of Dicotyledons already included in our herbarium. There are several weeds among the corn that must be noticed for their adaptability to this purpose. A pretty plant, with finely-cut leaves and bright scarlet flowers that have a strong likeness in form to the yellow blossoms of the buttercup, is called *pheasant's eye*. It belongs to the crow-foot tribe, *Ranunculaceæ*. for it has the indefinite stamens inserted on the *thalamus*, or receptacle, and the carpels free from each other which we have learned to associate with this order. As easy a plant to place is the minute *shepherd's needle*, or *Venus's comb*, with its finely-cut, bright green leaves and its umbels of small white flowers, which are succeeded by long-beaked seed-vessels. The epigynous stamens and the free petals gathered round a disc, together with the umbrella-like, or *umbellate*, way in which the flowers are arranged, readily enable us to number it among the *Umbelliferæ*, or *umbellate tribe*, to which you will remember the goutweed and the beaked parsley belong. Notice this small, prostrate plant, which, with a downy stem, downy halbert-shaped leaves, and flowers borne one in the angle each leaf forms with the stem, seems to be a near relation of the snapdragon. Like that plant, its flowers have the lips inflated, and yet closing on each other like the lips of a mask, a peculiarity which causes them to be called *personate*. In colour, the upper lip is a deep purple, while the lower is yellow. The *corn toadflax* is the name of the weed we have been gathering, and its alternate leaves, gamopetalous corolla, epipetalous, didynamous stamens, and two-celled ovary with axile placentation, mark it as belonging to *Scrophulariaceæ, the figwort tribe*. When we have gathered two other weeds we will leave the cornfields for a time. The *corn woundwort* is a little plant, with a spreading stem and blunt, heart-shaped leaves, which derives its name from its being used by herbalists to heal wounds. Its flowers, which are of a light purple colour, are borne in bunches of six in a bunch. The calyx is tubular and bell-shaped, the corolla lipped, the upper lip being arched, the lower three-lobed, with its side lobes bent back, and the front two of the four stamens are the longest. The *common hemp-nettle*, on the other hand, is an erect plant, two feet high, with a bristly stem swollen below the joints, opposite spreading branches with bristly leaves, and numerous flowers, the calices of which have long sharp teeth, and the corollas are variegated with light purple and yellow. Certain of the characters of these two plants—the square stems, opposite, decussate leaves, labiate corolla, epipetalous, didynamous stamens, and four-lobed, four-chambered ovary—show that they belong, like the sage, thyme, dead-nettle, etc., to *Labiatæ, the labiate tribe*, to which we shall be able to add other specimens presently.

Now let us go down to the river. By the bank we shall find a plant which bears the appropriate name of *brookweed*. It is a smooth pale green plant, with blunt fleshy leaves and clusters of very small white flowers. On examining the latter we shall see that they closely resemble the familiar blossoms of the primrose. The calyx is five-cleft and persistent, the corolla is salver-shaped, and has five scales at the mouth of its tube; the stamens, which are five in number, are epipetalous, and the capsule, or seed box, opens with five reflexed teeth, showing very clearly the free central placentation. The natural order to which the brookweed belongs is, as we should suppose, *Primulaceæ, the primrose tribe*. Very dissimilar in appearance to this small plant with its regular flowers is the handsome *greater skull-cap* with its large, irregular bright blue blossoms. Its stem is square and hollow; its leaves, which are oblong, notched, tapering and heart-shaped at the base, are also opposite and decussate, the calyx and corolla are both lipped, and the stamens are didynamous. Notice the curious calyx which gives the name of skull-cap to the plant. The upper lip bulges outward

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about the middle, and soon after the corolla has fallen off closes on the lower, giving it the appearance of a capsule with a lid. When the seed is ripe it opens again. This peculiarity of the calyx distinguishes the skull-cap from other members of *Labiatae*, *the labiate tribe*. The bur-marigold's button-like, drooping heads of brownish-yellow flowers, at the base of which are several leafy bracts, readily enable us to refer it to its natural order. As in the tansy, each flat flower-head is composed of tubular, perfect florets which have the stamens united by their anthers. We can have no hesitation in placing the bur-marigold among *Compositæ*, *the composite tribe*. The name of the plant is derived from its curious fruit. It is oblong in shape and terminates in several stiff bristles, each of which is thickly set with minute points, which are turned back like the barbs of an arrow, so as to take a firm hold on the coat of any animal which comes in contact with them.

A member of the same family as the bur-marigold, the *golden-rod*, is now abundant in dry woods. It has crowded clusters of small, bright yellow flower-heads, and resembles the daisy rather than the tansy. Though the florets of the ray and the florets of the disk are both yellow in colour, the former are strap-shaped and have pistils, but no stamens, while the latter are tubular and perfect.

On waste ground we may now meet with two typical labiate plants, the *horse-mint* and the *black horehound*. The horse-mint has egg-shaped leaves tapering to a point, which are downy and hoary beneath. The calyx is very hairy with an exceedingly short tube, and the corolla is lilac in colour. Like the *hairy-mint*, now abundant on the banks of rivers, and the *corn-mint*, it has a very strong, unpleasant scent. The black horehound, which has downy, wrinkled leaves, scalloped at the edge, and purpled flowers, possesses a quite distinct, but still more offensive odour. In this plant the calyx is funnel-shaped with five sharp equal teeth, the upper lip of the corolla is erect and concave, and the middle lobe of the lower lip is heart-shaped.

The heaths are now gay with the yellow flowers of the *dwarf-furze*, which is smaller in all its parts than the gorse or whin, already examined by us. The calyx is formed of two sepals with two minute bracts at the base, the papilionaceous or butterfly-shaped corolla, has spreading wings, the stamens are monadelphous, or united into one bundle, and the legume, or fruit-pod, is swollen and scarcely longer than the calyx. This member of *Leguminosæ*, *the pea and bean tribe*, loves to intertwine its rigid branches with the heath, whose waxy, rose-coloured or white blossoms bloom occasionally through the autumn. On the heath, too, may be seen the purplish-blue flowers of the *scabious*, the representative of a small order which we can now add to our corolliflora Dicotyledons. Let us, then, examine it more closely. Its calyx is attached to the ovary and is surrounded by several more or less rigid, calyx-like bracts, the corolla is tubular and four-cleft, the stamens four, free and epipetalous, the fruit dry and one-seeded, and crowned by the pappus-like calyx, the flowers arranged in heads. The mode of inflorescence and the character of the fruit remind us of *Compositæ*, but the anthers are free instead of being syngenesious, and the bract-like *involucel*, as it is called, surrounds each flower. The scabious belongs to *Dipsaceæ*, *the teasel tribe*, the most important member of which is the clothier's teasel, a plant with large heads of flowers which are embedded in stiff hooked bracts. These heads are set in frames and used in the dressing of broad-cloth, the hooks catching up and removing all loose particles of wool, but giving way when held fast by the substance of the cloth.

From the garden we may be able to get this month some of the greenish-white flowers of the *strawberry tree*, which now presents a very ornamental appearance, its rough reddish bark and large deep green leaves forming at once a harmony with and contrast to the globular scarlet berries of the preceding year, which ripen when the new flowers are in full blossom. A great contrast to this beautiful tree, which you will remember belongs to *Ericaceæ*, *the heath tribe*, is the *milk-thistle*, a common garden weed belonging to *Compositæ*, *the composite tribe*. The leaves are oblong, toothed, and prickly, the upper ones clasping the stem, which is branched, and like the dandelion, all the florets of the flower-head are strap-shaped and perfect. The milk-thistle forms a favourite food of rabbits. On the garden wall we may see the *ivy-leaved toadflax*, sometimes called *mother-of-thousands*, and the *wall speedwell*. Both these plants belong to *Scrophulariaceæ*, *the figwort tribe*. The former has long, rooting stems, fleshy leaves, the under surface of which is of a purplish tint, and small light purple flowers, which like those of the *corn toadflax*, are personate or mask-shaped. The latter is a downy plant, with egg-shaped leaves, which are heart-shaped at the base, scalloped and stalked, and its regular, inconspicuous light blue flowers are almost hidden among the upper leaves.

We are now in a position to begin this month's special task—the investigation of the second great class into which flowering plants are divided. First we will gather specimens of the cereals which have ripened in our fields, *wheat*, the bearded *barley*, *oats* and *rye*. Then from the margin of the stream we can get the *arrow-grass*, with its spikes of tiny greenish flowers, and the *great water plantain*, with its large-ribbed leaves. A very pretty river plant is now in bloom, the *common arrow-head*. It derives its name from its leaves, which are *sagittate*, or arrow-shaped. Its flowers, which rise well out of the water, are of a delicate flesh colour. In ponds we must now look for the *great reed-mace*, or *cat's tail*, the largest of our fresh-water plants, whose stout cylindrical stems, taller than a man, are surmounted by a club-like spike of flowers, from which it derives its names. There, too, we should meet with the *horned pondweed*, a tangled mass of thread-like stems and narrow dull olive-green leaves, with numerous axillary brownish flowers, which are either submerged or partially rise above the surface of the water.

Quite in the nature of a contrast to these water-plants is the curious little *lady's tresses*, which is now to be found in dry pastures. Its small white flowers, which are arranged in a spiral manner—in some specimens from left to right, in others from right to left—round the upper portion of the stalk, are fragrant in the evening. In dry pastures near the sea we may also find the purplish-blue blossoms of the *autumnal squill*, whose leaves appear after the flowers.

In woods and hedges in the west and south-west, especially in Devonshire, where it is one of the commonest of plants, the *stinking iris* may be met with. It is sometimes cultivated in gardens for the size of its berry-like seeds, which are of a beautiful scarlet colour, and are much prized for winter decoration. In the garden, too, we shall find the *asparagus*, now in

flower, and the light purple blossoms of the hardy bulbs erroneously called *autumn crocuses*. Properly they are *Colchicums*, or *meadow-saffrons*.

To these specimens, selected to show flower and fruit, we will add a few grains of wheat, carefully soaked, and will compare their structure with that of the bean already examined by us. We must, however, keep before us the fact that in a grain of wheat we have the *fruit* of the wheat-plant, while the bean is one of the *seeds* from a pod-like fruit or legume.

On removing the *testa*, or skin of the bean, two large, thickened lobes, or seed-leaves, are clearly visible; and on the margin of the inner face of one of them are the *plumule*, or bud of the future stem, with minute rudimentary foliage-leaves, and the *radicle*, or rudiment of a root. The radicle in a bean, subjected to the influences of air, warmth, and moisture, will be seen to break out in a downward direction, forming by its direct prolongation the primary root of the plant. On cutting open a grain of wheat, if we examine it with a small lens, we shall find that the *embryo*, or miniature plant, has only one *cotyledon*, or seed-leaf, which sheathes the *plumule*. The embryo is very small, only occupying a little place at the end of the grain, instead of taking up the whole of it as in the bean. When a grain of wheat germinates, another point of difference discloses itself: the *radicle* never directly lengthens, but internal rudimentary root-buds burst through it, and develop into the root-fibres of the plant.

We will now glance at the *venation*, or method of arrangement of the veins of the leaves of our plants. Instead of the leaves being *reticulated*, or net-veined, as in the case of the Dicotyledons examined by us, they are arranged in a parallel manner the length of the leaf, and are therefore said to be *parallel-veined*.

Passing now to the flower, we will examine the blossoms of the reed-mace, arrow-grass, water plantain, arrow-head, lady's tresses, stinking iris, asparagus, autumnal squill, and colchicum, simply with a view to the number of their parts—a point which we have found to be of considerable importance in the classification of plants. They have a six-leaved perianth, stamens three or six in number (except in the lady's tresses and arrow-head), and carpels three in number (except in the water plantain and arrow-head, where they are indefinite). We see then that the parts of the flower in these plants, instead of being arranged in fives, like those of most Dicotyledons, are arranged in threes.

From these observations we are now in a position to determine the characteristics of Monocotyledons, the second great class of flowering plants. They may be defined as plants with one seed-leaf or cotyledon, parallel-veined leaves, and the parts of the flower arranged in threes.

Reserving for the present the consideration of our cereals, reed-mace, and horned pond-weed, we will examine more closely the plants which, from their possessing a perianth of petal-like leaves, are numbered among the division of Monocotyledons known as *Petaloidæ*.

The autumnal squill and the asparagus are representatives of the large and important order, *Liliaceæ*, *the lily tribe*. The asparagus has creeping roots, scaly stems and bristle-like leaves, and its fruit is a berry. The autumnal squill, on the other hand, has a bulbous root, and its fruit is a capsule, or syncarpous, dry, splitting fruit. In both these plants the perianth has six free segments, the stamens are six in number, free and hypogynous, and the pistil of three carpels is syncarpous and superior.

Liliaceæ numbers among its members several useful plants. The onion, garlic, leek, chives, and shallot are serviceable vegetables; aloes and squills are employed in medicine, while one of the most important of fibre plants is the New Zealand flax. The asparagus is found wild in the Isle of Portland and near the Lizard in Cornwall. As early as the sixteenth century, it was cultivated as a vegetable in England. Some of our most beautiful garden flowers belong to this order, among the best known being lilies, tulips, hyacinths, squills, Star of Bethlehem, and the delightfully fragrant lily of the valley. Yuccas and Dracœnas are handsome foliage plants.

The stinking iris derives its name from its fœtid odour. Its sword-shaped leaves are so acrid as to leave a burning taste in the mouth, and its dull, leaden-coloured flowers are very unattractive in appearance. The three outer divisions of the perianth, which is six-cleft, are longer than the three inner, and are reflexed. The three stamens are free and epigynous, and are covered by the three petal-like stigmas. The ovary, which consists of three united carpels, is inferior. With the garden iris and the yellow iris of our marshes, this plant gives its name to the natural order *Iridaceæ*, *the iris tribe*.

Iridaceæ contains but few useful plants. Saffron, formerly much used as a drug, but now chiefly employed as a colouring matter, consists of the dried stigmas of the saffron crocus, which is still largely cultivated at Saffron Walden. The rhizome of the Florentine iris furnishes the orris root of commerce, which has the odour of violets and is much used in perfumery. The gladiolus and the garden crocus belong to this order.

The autumnal saffron, or colchicum, resembles a crocus in appearance with its long tube, but the number of the stamens by itself might distinguish it from that plant. They are six instead of three in number, and the anthers are turned outwards. It belongs to the small order *Melanthaceæ*, *the meadow-saffron tribe*. Colchicum is considered a specific for gout.

The leaves of the lady's tresses must be gathered before it comes into flower, as the tuft withers when the blossoms begin to expand. The new leaves which arise from the base of the old stem will unfold even while subjected to pressure during the process of drying. Insignificant as the plant is, it belongs to one of the most curious and distinct of natural orders. Its irregular perianth, inferior ovary, and single anther adherent to the pistil mark it out as a member of the extensive order *Orchidaceæ*, *the orchid tribe*. Variable as are the fantastic flowers of this order, the central column formed by the union of the stamens and style makes the plants belonging to it easy of identification. Let us look more closely at this curious feature. Of the three stamens we should expect to find, the central one only is apparent, the other two being suppressed. The column seems to stand in the centre of the flower, occupying the place where we should expect to find the style and stigma, apparently absent altogether; these organs are in reality united to the filament of the stamen, forming the column. The two anther lobes of the stamen are seen at the top of this structure facing forwards, and the

stigma is a sticky disc situated in front of the column below them. The anther lobes are very curious, for instead of containing a powdery mass of pollen, as most anthers do, they have all the pollen grains glued together and fastened to the end of a long stalk, so that when ripe they can be removed all in a single piece, which will adhere to anything that touches the anther.

The lower lip of some species of orchids resembles insects in form, size, and colour. The bee orchis and the fly orchis occur in many limestone and chalk districts, and are easily recognised ; the former flowers in June and July, the latter a little earlier. The lip of the bee orchis is of a very rich velvety-brown colour, broad, and very convex ; that of the fly orchis is oblong and of a purplish-brown hue, with pale marks in the centre. The spider orchis are of rare occurrence. The monkey orchis is very handsome, with its dense oblong spike of variegated flowers. In England it is confined to the counties bordering on the Thames, from Berkshire downwards. The lizard orchis has a very curious strap-like lip, and is scarce in Britain. The greenish-white flowers of the butterfly orchis, like those of the lady's tresses, are fragrant in the evening. This plant grows on heaths and the margins of woods, and flowers in June. The man orchis is so called from a fancied resemblance to the body of a man hung by the head. It has greenish-yellow flowers bordered with red, and possesses a heavy, unpleasant odour.

The *Orchidaceæ* can claim very few useful plants. Vanilla is obtained from the dried fruit of the vanilla plant, and a nutritious substance called salep is prepared from the roots of the spotted orchis and other species. The flowers of many tropical species are extremely beautiful, and are among the most treasured of exotics. Many orchids are *epiphytal* in their habit—that is, they grow on the trunks of trees, without becoming organically united to them, as parasites. They cling to the bark by means of their long greenish, or white, aerial roots, and absorb moisture partly from the air and partly from what trickles down the tree, laden with inorganic and decaying organic matter.

Let us look now at our water-plantain and arrow-head. Both these plants have a perianth of six leaves, and an apocarpous pistil with numerous superior ovaries. These are the marks of an order of aquatic plants called *Alismaceæ, the water-plantain tribe.* In the water-plantain, the lilac flowers, the perianth leaves of which are very delicate and soon fall off, are perfect, containing both stamens and pistils, and the stamens are six in number. In the arrow-head the stamens and pistils occur in different flowers, and the stamens as well as the carpels are numerous. The Chinese are said to use the fleshy rhizome of the arrow-head as an article of food, and the juice of some Brazilian species is employed in the preparation of ink.

The arrow-grass, if glanced at carelessly, might be taken for the sea-plantain. Like that plant, it has long, narrow, fleshy leaves and spikes of inconspicuous flowers. On a closer examination it will be seen not to belong to the same division of flowering plants. The sea-plantain belongs to the order of *Dicotyledons* known as *Plantaginaceæ*, plants with net-veined leaves, calyx and corolla four-parted, stamens four, alternate with the segments of the corolla, capsule dehiscing transversely. The arrow-grass belongs to the order of *Monocotyledons* known as *Juncaginaceæ*, plants with parallel-veined leaves, a six-cleft perianth, stamens six in number, ovaries three to six, superior. *Juncaginaceæ* is sometimes included in the order *Alismaceæ.*

The plants of the orders of *Monocotyledons* we have hitherto examined,—*Liliaceæ*, *Iridaceæ*, *Melanthaceæ*, *Orchidaceæ*, *Alismaceæ*, *Juncaginaceæ*—have all been seen to possess a more or less petal-like perianth. They belong to the sub-class of *Monocotyledons* called *Petaloidæ*, Monocotyledonous plants possessing a flower-like perianth. The great reed-mace has its perianth reduced to three bristles, and while in the horned pond-weed, which is monœcious, the female flowers have a bell-shaped perianth, the male flowers have no perianth.

These two plants have a curious inflorescence. The flowers are closely packed in rings on a fleshy spike or *spadix*. They are therefore classed under the second sub-class of Monocotyledons, *Spadicifloræ*, plants with their flowers arranged on a spadix.

The spadix of the reed-mace is club-like in appearance, and has its pistillate flowers inserted on its lower part, with the staminate flowers above them. The three stamens are *monadelphous*, being united into one bundle, and the anthers are *erect*. The ovary in the pistillate flowers is free, solitary, and one-celled. The reed-mace is the type of *Typhaceæ, the reed-mace tribe*, an order the plants of which possess no remarkable properties.

The horned pond-weed is a floating plant, with slender, opposite, thread-like leaves, and axillary flowers. The male flowers have one stamen, the female a four-leaved perianth, a persistent style, and unevenly cup-shaped stigmas ; the varieties are four in number and distinct. *Naidaceæ, the pond-weed tribe*, furnishes us with no useful plants.

We come now to the consideration of the third sub-class of Monocotyledons. Our wheat, barley, oats, rye and sedge are all alike in one respect : they have chaffy glumes or scale-like bracts enclosing the flowers, a peculiarity which refers them to *Glumiferæ*, glumaceous plants.

We will examine more closely the flowers of the wheat. They are arranged in short broad *spikelets*, disposed in two rows along the top of the stem, forming a thick, obtusely four-cornered *spike*. On breaking the spike in two, and taking one of the lowest spikelets from the upper half, we shall see that it is attached to the *rachis*, or axis of the spike, by its side. It consists of a pair of nearly opposite hard, dry, scaly leaves, the *outer glumes*, which enclose three to five flowers arranged alternately on opposite sides of the axis of the spikelet. Each flower is enclosed between a *flowering glume*, which is similar in appearance and texture to the outer glumes, and a *pale* with two lateral nerves and no midrib. Between the pale and the flowering glume we shall see three free stamens, and a superior ovary crowned with two plume-like stigmas. The corolla, or, according to some botanists, the whole perianth is represented by two tiny scales, called *lodicules*, inserted under the ovary.

In the barley, the spikelets are arranged in threes on each joint of the rachis, and the flowering glume terminates in a bristle or *awn*. In rye, the spikelets are arranged singly on the rachis, as in wheat, and each spikelet contains, beside the two lateral fertile flowers, a minute pedicel, or flowerstalk, representing a central flower. The oat has its spikelets arranged in *panicles* with stalked flowers.

The stem of cereals is called a *culm*. It is hollow,

jointed, and has sheathing leaves. At the base of the blade of each leaf, where it passes into the sheath, is a *ligule*, or scaly projection. The fruit, popularly but incorrectly called the seed, has its seed-vessel or *pericarp* closely adherent to the seed, and is called a *caryopsis*. In barley and oats, the pale and flowering glume adhere to the caryopsis after flowering, and have to be removed from the grain by grinding. In wheat and rye, the caryopsis is free.

Gramineæ, the grass tribe, the order to which our cereals belong, contains our most important food plants. In Italy, maccaroni and vermicelli are prepared from the finest wheat flour. Rice is the chief food in tropical countries, and maize, or Indian corn, is much used in the New World. Its leaves are used for packing oranges. Malt is obtained from barley, and sugar from the tall solid stem of the sugar-cane. In China and Japan, the jointed, hollow stems of the bamboo are used in one way or another for nearly every article of household utility.

We can now arrange our specimens in the herbarium. In a coloured wrapper, with the inscription 'Petaloidæ; Monocotyledons with a flower-like perianth,' we shall have six brown paper sheets.

The first must be labelled, '*Liliaceæ, the lily tribe;* Monocotyledons with a six-cleft inferior perianth, six free hypogynous stamens, their anthers opening inwards, and a pistil of three united carpels.' It will contain the asparagus and the autumnal squill.

In the second sheet we can only place at present the stinking iris. The label will be '*Iridaceæ, the iris tribe;* Monocotyledons with a sixth-cleft perianth, the three outer divisions of which are reflexed, three free perigynous stamens covered by the petal-like stigmas, and an inferior ovary of three united carpels.'

The third sheet, which will contain the autumnal saffron, must be marked '*Melanthaceæ, the meadow-saffron tribe;* Monocotyledons with an inferior six-parted perianth, six stamens, the anthers turned outwards, and fruit bursting inwards.'

The lady's tresses must be placed in the fourth sheet with the label '*Orchidaceæ, the orchid tribe;* Monocotyledons with an irregular perianth, inferior ovary, and stamens and style united into a central column.'

The fifth sheet will contain the water-plantain and the arrow-head, and should be marked '*Alismaceæ, the water-plantain tribe;* Monocotyledons with monœcious flowers, a six-cleft perianth, and an apocarpous pistil with numerous superior ovaries.'

In the sixth sheet we must place the arrow-grass, and affix the label '*Juncaginaceæ, the arrow-grass tribe;* Monocotyledons with a six-cleft perianth, six stamens, ovaries three to six, superior.'

For the second coloured wrapper labelled '*Spadiciflorœ;* Monocotyledons with their flowers arranged on a spadix,' we have specimens of only two orders.

In the first brown paper sheet we must place the reed-mace. The label will be '*Typhaceæ, the reed-mace tribe;* Monocotyledons with monœcious flowers, three monadelphous stamens with erect anthers, and a free, solitary, one-celled ovary.'

The second sheet will contain the horned pond-weed, and must be labelled '*Naidaceæ, the pond-weed tribe;* Monocotyledons with monœcious flowers; inferior perianth; stamens free, one, two, or four; ovaries four, distinct.'

Our last coloured wrapper must be inscribed '*Glumiferæ*, glumaceous plants.' It will contain the brown paper sheet marked '*Gramineæ, the grass tribe;* plants with their flowers sheathed by glumes, the innermost glume or pale being two-nerved.' The specimens we can place in this sheet are the wheat, barley, oats, rye, and possibly some grasses.

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CONVERSATIONAL DRAWING LESSONS FOR INFANTS.

BY MRS. E. MORTIMER,

Author of Practical Kindergarten Lessons for English Infant Schools; Lecturer on the Kindergarten at the Home and Colonial Training College.

Oblique Lines.

Vertical and horizontal lines having been fairly mastered by the children whilst working the various exercises already given, it is now time to introduce the Oblique Line.

This should be done in the same order as the other lines, although probably it will be found that fewer exercises with the short lines will be necessary, as the children should now have acquired a certain power over the pencil. At the same time it is very important for the teacher to remember that they have no lines now to guide them, their only help being the corners of the squares as they draw the diagonals.

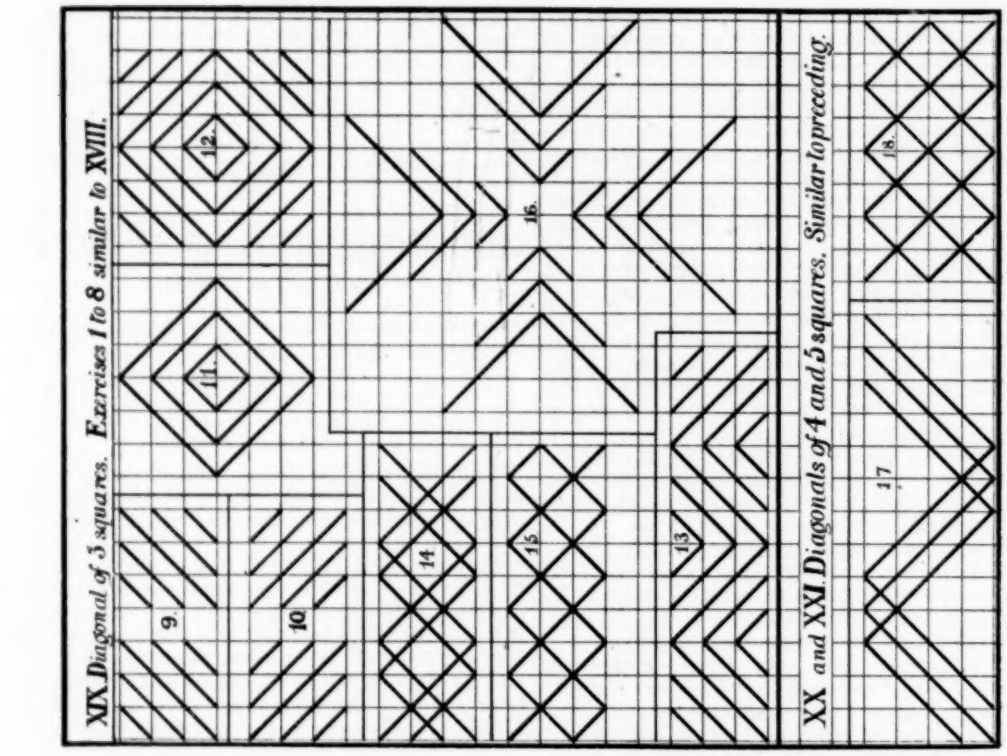
The diagonal of one square is first given, then that of 2 squares, followed by 3, 4, and 5. The different lengths are then combined to form patterns.

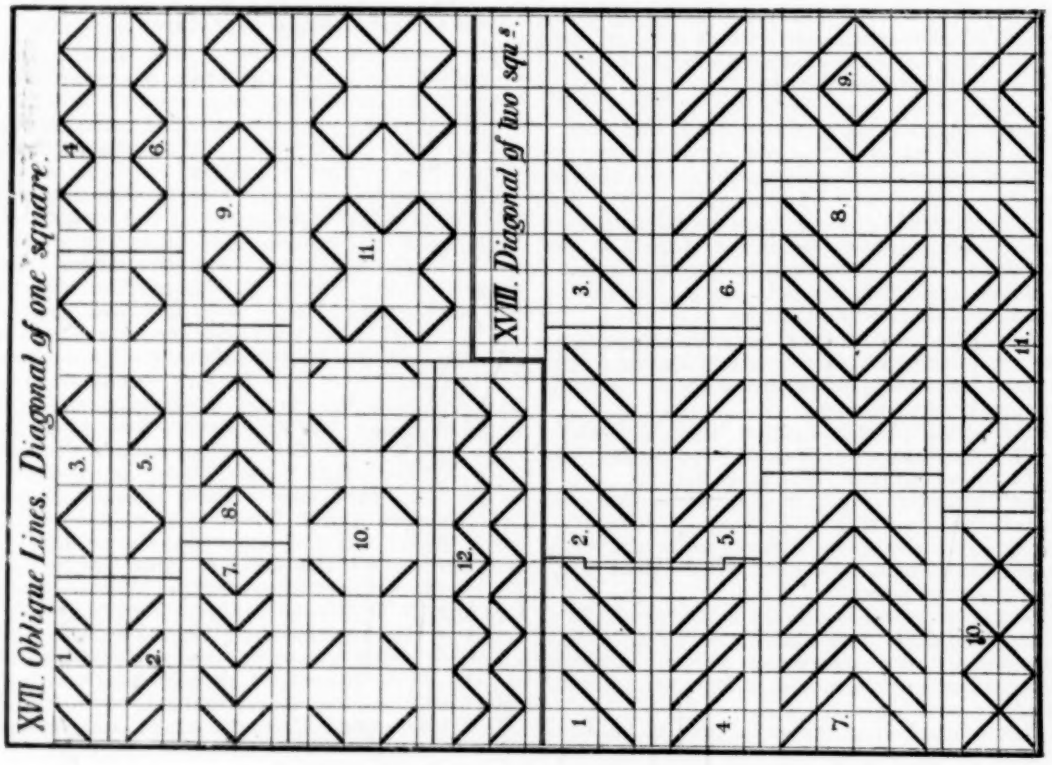
Notes of a Lesson on Pattern XIX.—16.

The children to be provided with drawing books (chequered) and nicely-pointed pencils, and the teacher to have a chequered blackboard.

The children to be questioned on the kind of lines they have been drawing lately. How many different kinds of lines? Their names, etc.

The teacher to count three squares, beginning at the left top one, and to make a mark at the corner. The children to do the same in their books. Now watch me. What have I done? You have drawn a line. What kind of a line? An oblique line. Through how many squares? Very well, now you draw one like it. Begin where you made the little mark, then draw through the first corner and the next corner to the third one. You must be very careful always to draw your lines quite through the corners. Now you must look again. Count six squares from where you began your first line, and then look and see what I am going to do. Well? You have drawn another oblique line. How long? Three squares. In what direction does it go? From right to left. Where does it finish? At the bottom of the other line. In what direction was this drawn? From left to right. Yes, just the opposite to the other line. What do the two lines make? They make an angle. What did you say, Tommy? It looks something like the letter V. Yes, but rather a wide one. And what are you going to say, Mary? It looks like a right angle? That is quite right; when two lines meet like these two they always form a right angle. Have you drawn a right angle


XIX. Diagonal of 3 squares. Exercises 1 to 8 similar to XVIII.
9.
10.
11.
12.
13.
14.
15.
16.
XX. and XXI. Diagonals of 4 and 5 squares. Similar to preceding.
17.
18.


XVII. Oblique Lines. Diagonal of one square.
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
XVIII. Diagonal of two squ.s.
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.

before? How did you make it? You, John, may come and make one on the blackboard for me. Now we will go on with our drawing. Watch me again. What have I drawn? Another oblique line. How long this time? Two squares. Where does the line finish? One square below the point where the other two lines meet. Do you think you can draw one the other side the same length to come down and meet this one. That is very nice. What do these two lines form? Very good. Now look again and tell me what I have drawn? A line one square long. Where does it leave off? Under the other two. You may draw one like it, and then one on the other side the same size to meet it. Let us see what we have drawn. Two lines of three squares long meeting together and forming a right angle, then two lines of two squares long and two of one square long; each of these also forming a right angle. How many right angles altogether? Three, one above the other. Do you notice any difference in the angles? No, they are all exactly the same though the lines that form them are of different lengths.

To impress on the children that the lines thus drawn form right angles it would be advisable for the teacher to draw on another part of the board two lines similar (say to the three squares), and then to complete the square of which these are two sides.

Now look again at the blackboard. From this bottom point I want you to count two squares and make a little mark. What have I done? Drawn a line one square long. In what direction? From right to left. Yes, and now? Drawn one the same length on the other side. Which way is that? From left to right? What is it like? It is like the last of the first three, only upside down. Yes, now you may draw one like it, only take care where you begin and that you draw your lines carefully. I wonder if anyone can think what the next part of the pattern is. Well, Jane, you come and draw it on the blackboard. Very good; you may all draw the same in your books, and then you may draw the next two lines 3 squares long. Now we have finished half of our copy and I think if I help you a little you will be able to draw the rest yourselves.

All of you point to the middle of the pattern and then count one to the left and watch what I am going to do. Well, what have I done? Yes, I have drawn two lines meeting in a point just like those we have already drawn. How long are the lines? Can anyone tell me what we shall have to do next? Yes, that is quite right, and now I should like you to finish this part of the pattern and let me see how nicely you can do it by yourselves. That is very good. I think we have some very good boys and girls this morning.

What have we to do now? Yes, we have to draw the right side of the pattern. Do you think you can do it quite alone? Well, I will just show you where to start, so that we can all finish without any mistakes. That will do very nicely. I want you to look at your pattern and tell me how many squares there are in the centre without any drawing on them. Yes, there are four squares. Now can you tell me anything the pattern reminds you of? Yes, it looks like a cross.

Should the work of the class not be quite satisfactory, the teacher should give another exercise on similar lines by commencing with the diagonals of three squares in the centre.

(To be continued.)

COMMON-SENSE LESSONS IN EVERY DAY HOUSEWORK.

BY MRS. E. A. SHARMAN,

Lecturer to the National Health Society,
Author of 'Family Cookery.'

How To Lay a Table for Dinner.

Having now learnt the principal methods of managing a home, a girl can turn her attention to a point which is often neglected by a good housewife: that of setting the table for dinner, or other meals. It is a strange fact that many homes, having good reputations for cleanliness, order, and method, are still wanting in all the little niceties which add so much comfort and grace to everyday life. One would think that when a housekeeper had taken so much care to have her house linen so beautifully white and smooth, that she would be equally particular with her table linen. But how often do we find a soiled and creased cloth laid upon the table for family meals, also earthenware of half-a-dozen different patterns, glass dim, cutlery with chipped handles and unpolished blades, and no order and method in placing the various articles upon the table, so that when wanted for use someone must rise and fetch the forgotten article; while in serving the meal, one member of the family will bring in or remove the meat, another the vegetables, a third the pudding, until there is nothing but discomfort and disorder from beginning to end of the meal? This branch of housekeeping is often more than otherwise neglected by a good housekeeper. When there are several girls in a family they could easily take it in turns weekly to be responsible for the proper setting and waiting upon the table. Such a habit established in childhood would soon show the mother who was the careful, natty girl in the family. Mothers make a great mistake in doing the homework themselves to save trouble, instead of teaching and overlooking the girls. It is in childhood and youth when work is learnt and good habits formed. The most useful knowledge a girl can attain is to know all about the things which surround her in daily life.

How to set the Table.—If there is a fire in the room when it is time to lay the cloth a girl should make it look bright, and sweep the hearth up. She must then make herself look neat and clean, smooth her hair, and put on a clean apron. The latter might be always kept for the purpose. Get all things together that are required for the table. First see that the saltcellars and cruet are properly filled, rub two dry lumps of salt together over a plate, and fill the saltcellars with the powder. Never use damp salt, make it smooth at the top, and lay the saltspoon upon it. Mix mustard in a cup with a little cold water until smooth, then pour it into the mustard-pot, taking care to drop it in without soiling the sides or top. Do not mix too much at once. Mustard when damp soon loses its flavour and colour, tastes nasty, and has to be thrown away, which is wasteful. Wipe the bread-basket out, if one is used, and put a loaf or part of a loaf into it with a knife by its side. It is always more economical for the family to cut bread as it is wanted. Fill the water jug, and see that the glasses are bright and clear. Put all these things upon a tray, and carry them into the room, setting the tray down in a safe place. Lay the tablecloth even and straight, by

putting it flat upon the table when unfolding it; it should never be *thrown* on the table or it will crease,—the effect of a dinner-table is quite spoilt by using a dirty, crumpled tablecloth. Place a plant or vase of flowers in the middle of the table (when these are not to be had, fruit looks pretty instead), then two mats, one at each end of the table, with a third at the right-hand corner for standing the gravy-boat upon; this will prevent father from splashing the tablecloth when carving the joint. Put the water jug at the right-hand corner of mother, and the bread-plate at another corner, so as to be within easy reach for cutting. The cruet is put into the middle of the table, and the tablespoons and saltcellars at opposite corners. Place a large and small knife and fork, with pudding spoon, for each person, laid on the right-hand side. Arrange all these in front of the person seated, and a little way from the edge of the table. Sometimes the small fork and spoon are laid quite in front of the plate, with the prongs of the fork to come halfway along the spoon, and the bowl of the spoon the same to the handle of the fork. Tablespoons are always laid crosswise in this manner, having the bowls upwards, and the salts in the middle between the spoons. Lay a carving knife and fork at the end of the table where father sits. Some people use serviettes, which is a cleanly habit; they are placed, carefully folded or within a ring, at the right-hand of each person; finish by putting round the table a chair for each person, and summon the family to dinner. Carry the dishes from the kitchen separately, putting the joints of meat at the top and bottom of the table, and the vegetables at the sides. If only one joint and one vegetable are served, place them at the top and bottom of the table—the meat before father, the vegetable before mother. See that all is ready, so that there need be no unnecessary going in and out of the room to fetch this thing and the other, which ought to have been in its place when required. If you have to wait at table, which need not prevent you taking your own dinner at the same time and table, offer each dish at the left hand of the person served. Do not fill glasses too full, and move about with as little noise as possible. It takes some time to learn to lay a table properly, and to place everything needed upon it. A table may be made to look very pretty and bright at small cost, by laying upon the tablecloth a long strip of broad plain coloured ribbon lengthwise, instead of using mats. Sash ribbon at 6d. a yard, with the ends fringed, does very nicely, and is inexpensive.

In waiting at table, when the first course is finished remove each plate with knife and fork, putting the knives altogether upon a tray and the forks also, then the carving knife and fork, and the meat and vegetable dishes last. Bring in the pudding or other sweet, hand it round, and when all is finished take away the plates, knives, forks, and spoons, and begin to clear the table, putting everything down gently upon the tray, and not heaping the things up too much.

Remove pieces of bread with a fork, and *brush* the crumbs from the tablecloth instead of *shaking* them off. Go to the end of the table and commence to fold the cloth carefully in its own folds, then put it away immediately into a special drawer, so that it may not become soiled and creased. Lastly, bring in a dustpan and hand-brush, and sweep up any crumbs that may have fallen upon the floor.

The breakfast-table is laid in a similar manner to the dinner-table, but having fewer knives, forks, spoons, etc. A tray, holding cups and saucers, is placed at one end of the table for mother to serve tea or coffee.

Afternoon tea is a simple meal consisting of a cup of tea with bread and butter or cake, and does not require the table to be set for the occasion.

Supper is a more substantial meal, for which the table must be set as for dinner. It is usual to serve everything cold for supper.

In conclusion I cannot urge a girl too strongly to try to cultivate little refinements in her home. It does not cost much extra trouble, only a little method, to keep the tablecloth snowy white and smooth, and to brighten the table with a few flowers, leaves, or fruit, to keep the fireside tidy, to see that the little ones wash their hands and smooth their hair before sitting down to a meal, and to have 'a place for everything, and everything in its place.'

—o—

SPECIMEN NOTE, TIME, AND EAR TESTS FOR THE CODE EXAMINATION.

BY W. G. MCNAUGHT,

Associate of the Royal Academy of Music.

The tests given in this series are adapted to the new examination of Pupil Teachers in Practical Music now in force. Pupil Teachers are now expected to perform *individually* the tests the children in the schools are expected to perform collectively. First Year Pupil Teachers are required to sing the same tests as School Division III., specimen tests for which were given in the March and May numbers of THE PRACTICAL TEACHER.

DIVISION IV.—STANDARDS V. and upwards, and Pupil Teachers, Second Year.

NOTE TEST.

Tonic Sol-fa.

Note Test. (*Written or printed.*)—To Sol-fa slowly, any simple diatonic passage in the major key; also a similar simple passage containing a transition of one remove indicated by bridge notes.

Also to Sol-fa a short passage in the minor key or mode, introducing *se* used thus—*l se l*, but without introducing *fah* or *ray*.

(*N.B.*—The revised instructions recently issued expressly exclude *soh* from the minor mode test.)

Special preliminary tests are not given at this stage. The tests for Division III. suffice for this purpose.

STANDARD TESTS.

Major Key (diatonic passages).

Doh = C or D. Range t_1 to r'

165. d s m f r m d d' l s t d' m s f r m d‖
166. m d s m r f l s d' t r' d' s m l r f t_1 d‖
167. s f m s f l s m r d f m r l s m f r d‖
168. d' t d' m s l s r m s d' t d' s f m l t_1 d‖

Doh = F or G. Range s_1 to s.

169. d r m s_1 l_1 s_1 t_1 r d m t_1 d f m r m d s_1 l_1 t_1 d‖
170. m d s_1 d t_1 r f m r l_1 d t_1 d m r s_1 d r m t_1 d‖
171. s m r f m d t_1 r d l_1 s_1 d t_1 d r m f l_1 d r d‖

Doh = B♭.

172. d t_1 r d s_1 m r d t_1 l_1 s_1 m f m r l_1 d t_1 m r d‖
173. d s_1 m, d t_1 r d s_1 f_1 m, f_1 l_1 s_1 d t_1 d r s_1 t_1 r d‖

Major Key, with transition.

Doh = C (or D). G. t. f. C.

174. d r m s f r m ^{s}d t$_{l}$ d s$_{l}$ l$_{l}$ s$_{l}$ t$_{l}$ r d ^{d}s f r m d ‖

G. t. f. C.

175. m s d r m ^{l}r d t$_{l}$ d s$_{l}$ d m r t$_{l}$ r d ^{r}l s f m m r d ‖

G. t. f. C.

176. d t$_{l}$ d r m f r m ^{m}l$_{l}$ t$_{l}$ d s$_{l}$ d m m r d ^{s}$_{l}$ r m f t$_{l}$ d ‖

G. t. f. C.

177. m r d m s m s d^{l} ^{d}^{l} f m r t$_{l}$ d r m d s$_{l}$ ^{l}$_{l}$ m m f r d ‖

With leaps after change of Key.

G. t. f. C.

178. d t$_{l}$ d f m r s ^{s}d t$_{l}$ s$_{l}$ m r d s$_{l}$ ^{s}$_{l}$r f m r d ‖

G. t. f. C.

179. m s f r m d m ^{l}r t$_{l}$ d m s$_{l}$ ^{d}s l f m r d ‖

G. t. f. C.

180. d m r f m r s ^{m}l$_{l}$ t$_{l}$ r d m r t$_{l}$ d ^{r}l f m f r d ‖

In higher Keys.

Doh = F. C. t. f. F.

181. d s$_{l}$ l$_{l}$ t$_{l}$ m r d$_{l}$ m ^{s}d^{l} t d^{l} r^{l} t s d^{l} ^{d}^{l} s f m f l$_{l}$ t$_{l}$ r d ‖

C. t. f. F.

182. m r d t$_{l}$ f m r s$_{l}$ ^{m}l t d^{l} m s s f m ^{f}d r f m r d ‖

Doh = G. D. t. f. G.

183. d s$_{l}$ m$_{l}$ s$_{l}$ d r t$_{l}$ s$_{l}$ ^{s}$_{l}$d t$_{l}$ r d m s l s ^{s}r d f m r t$_{l}$ d ‖

Doh = A. E. t. f. A.

184. m d t$_{l}$ r d m$_{l}$ s$_{l}$ l$_{l}$ f$_{l}$ ^{r}s$_{l}$ d t$_{l}$ f m r ^{r}l$_{l}$ t$_{l}$ d f m r d ‖

Change to first flat Key.

Doh = D. f. G. D. t.

185. d t$_{l}$ d m f r m s ^{d}^{l} s f f m r m r d ^{d}f m f l s t d^{l} ‖

Doh = D. f. G. D. t.

186. m r m s d m s d^{l} ^{d}^{l}s f m s d f m ^{m}l t d^{l} f m l s d ‖

Doh = D. f. G. D. t.

187. s f m s r m d ^{f}d t$_{l}$ d r f m r m ^{s}d^{l} t d^{l} s l m r d ‖

Doh = F. f. B♭. F. t.

188. m r t$_{l}$ d m s ^{s}r d f m r t$_{l}$ d f r m ^{s}$_{l}$d t$_{l}$ d r m d ‖

Doh = F. f. B♭. F. t.

189. d s$_{l}$ l$_{l}$ t$_{l}$ d r f m ^{d}s$_{l}$ f$_{l}$ m$_{l}$ f$_{l}$ l$_{l}$ s$_{l}$ t$_{l}$ d ^{d}f m r t$_{l}$ d r t$_{l}$ d ‖

Doh = G. f. C. G. t.

190. d s$_{l}$ d m$_{l}$ f$_{l}$ l$_{l}$ s$_{l}$ ^{s}$_{l}$r m f m f s l s ^{d}^{l}f m r t$_{l}$ d m r d ‖

Minor Key Passages.

N.B.—Leaps to *ray* are nearly always difficult in minor key passages.

Lah = A. Doh = C.

191. l m l d^{l} t r^{l} d^{l} t l se l r m d r m d^{l} l ‖

192. l d^{l} l m d r m l se l t d^{l} d m l l se l ‖

193. l m d^{l} t l se l m l r m t$_{l}$ d m d^{l} t t l ‖

194. l d^{l} t m l se l d r m t$_{l}$ r d m l se l ‖

Lah = E. Doh = G.

195. l$_{l}$ d t$_{l}$ r d m$_{l}$ l$_{l}$ se$_{l}$ l$_{l}$ t$_{l}$ d m r l$_{l}$ d t$_{l}$ l$_{l}$ ‖

196. l$_{l}$ m r d t$_{l}$ r d l$_{l}$ m d l$_{l}$ se$_{l}$ l$_{l}$ d t$_{l}$ m r l$_{l}$ se$_{l}$ l$_{l}$ ‖

197. l$_{l}$ d r m l$_{l}$ se$_{l}$ l$_{l}$ t$_{l}$ r d l$_{l}$ t$_{l}$ l$_{l}$ m l se l m d r m l ‖

198. m r d l$_{l}$ se$_{l}$ l$_{l}$ t$_{l}$ m l$_{l}$ m r t$_{l}$ d r d l$_{l}$ se$_{l}$ l$_{l}$ d t$_{l}$ l$_{l}$ ‖

Lah = G. Doh = B♭.

199. l$_{l}$ d l$_{l}$ m$_{l}$ r$_{l}$ d$_{l}$ m$_{l}$ l$_{l}$ se$_{l}$ l$_{l}$ t$_{l}$ d r t$_{l}$ d l$_{l}$ se$_{l}$ l$_{l}$ t$_{l}$ l$_{l}$ ‖

200. l$_{l}$ d m$_{l}$ r$_{l}$ m$_{l}$ l$_{l}$ r$_{l}$ m$_{l}$ l$_{l}$ se$_{l}$ l$_{l}$ m$_{l}$ d t$_{l}$ l$_{l}$ r t$_{l}$ d l$_{l}$ se$_{l}$ l$_{l}$ ‖

Lah = C. Doh = E♭.

201. m r t$_{l}$ d l$_{l}$ l se l m r m l t d^{l} l se l m d r m l ‖

202. l d^{l} t l se l m r d r m l d^{l} t l se l r m r d m d^{l} l ‖

Staff Notation.

Note Test.—To sing slowly, using the Sol-fa syllables, from the Examiner's pointing, any simple diatonic passage in the Keys of G (one sharp), D (two sharps), F (one flat), or B flat (two flats); and also a similar simple passage containing accidentals to raise the fourth of the scale (approached by the third or fifth) and to flatten the seventh (approached by the octave) properly contradicted.

Also, to sing in the same way as above described, a short passage in the Key of A minor, introducing the sharpened seventh approached from and leading to the note A, but without introducing the sixth (major or minor) of the scale.

Major Keys; Diatonic Passages.

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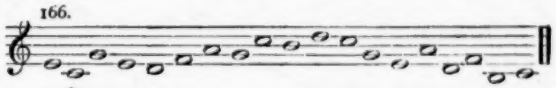
166.



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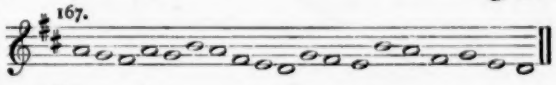

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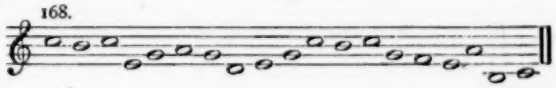

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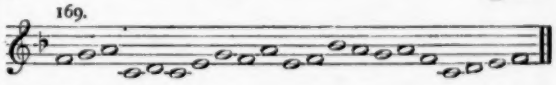

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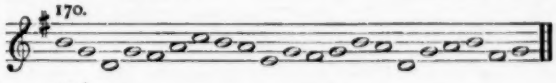

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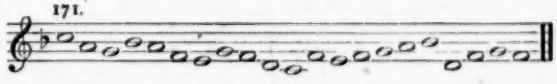

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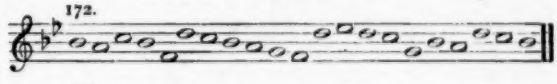

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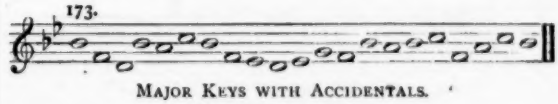

Major Keys with Accidentals.

♯ contradicted by ♮.

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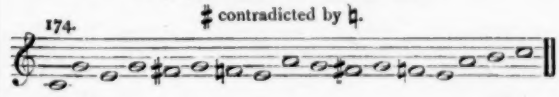

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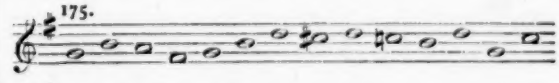

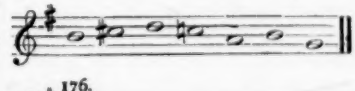

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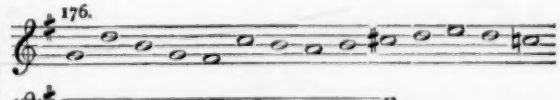

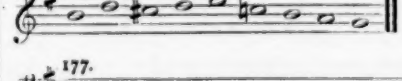

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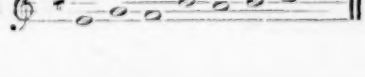

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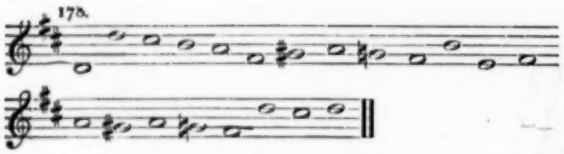

♮ used as a ♯, contradicted by a ♭.

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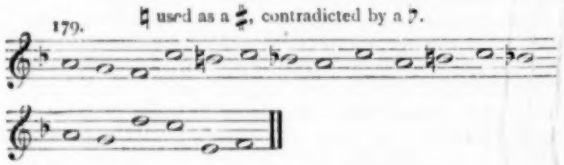

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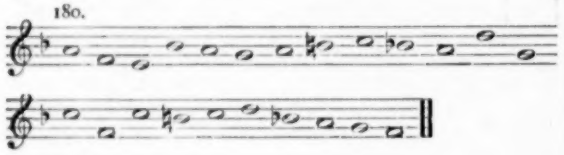

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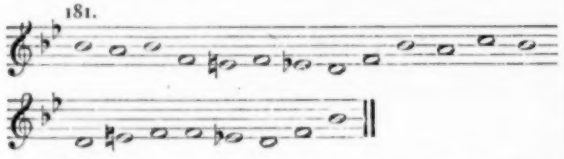

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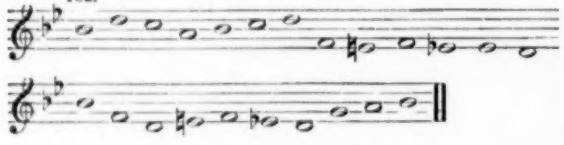

♭ contradicted by ♮.

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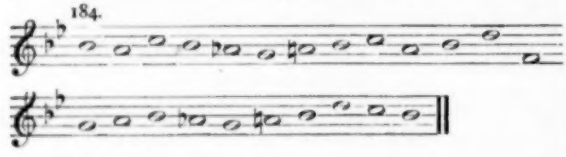

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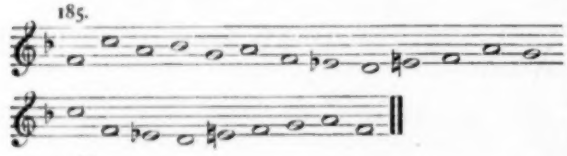

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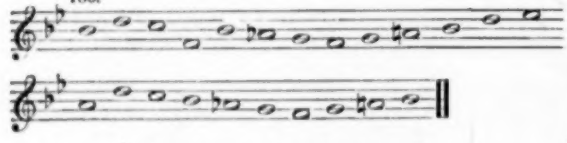

♮ used as a ♭, contradicted by a ♯.

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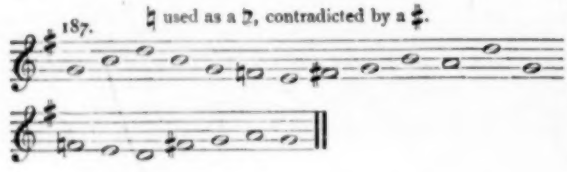

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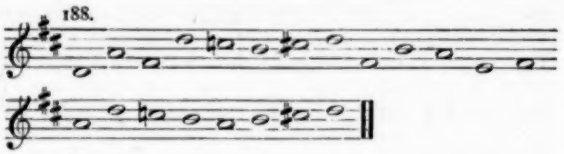

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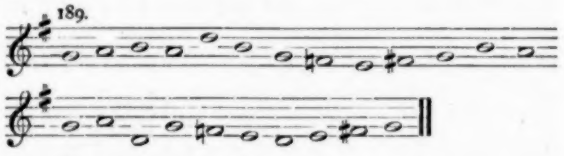

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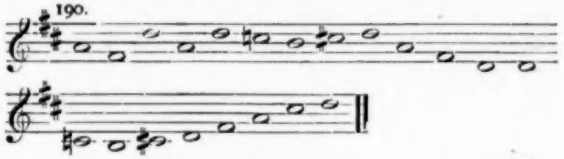

Minor Key Passages.

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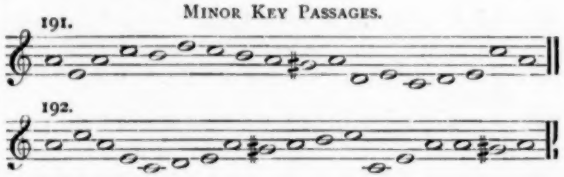

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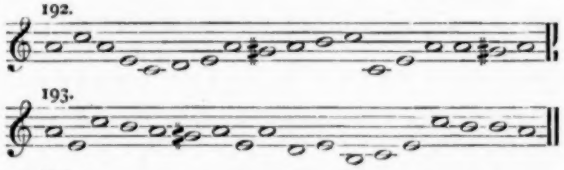

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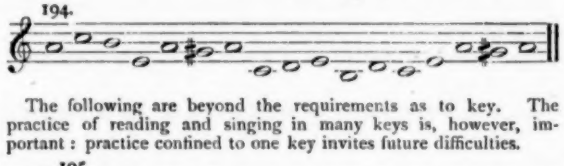

The following are beyond the requirements as to key. The practice of reading and singing in many keys is, however, important: practice confined to one key invites future difficulties.

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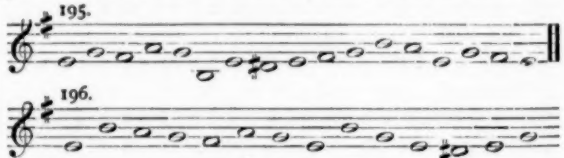

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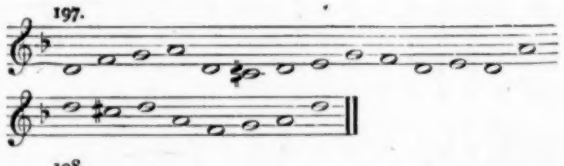

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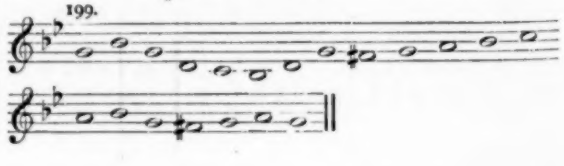

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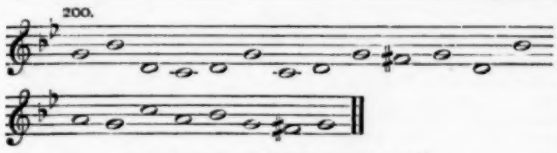

The sharp seventh (se) shown by a ♯.

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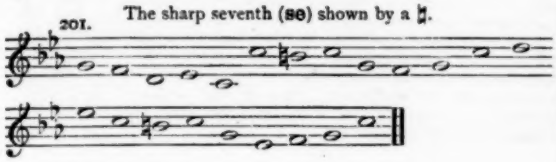

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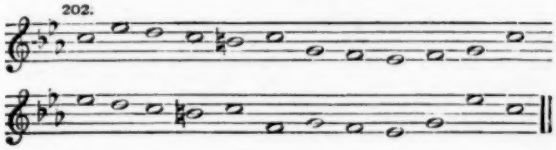


NEW COMPOSITION STORIES.—STANDARD V.

Suitable for 'Unseen Tests' in Reading also.

No. 162.

A PRINCE'S PROCRASTINATION.—A touching story is told of the late Prince Napoleon, son of Napoleon III. He had joined the English army, which was then fighting the Zulus in South Africa, and was one day at the head of a squad, riding on horseback, outside the camp. It was a dangerous situation. One of the company said: 'We had better return. If we don't hasten we may fall into the hands of the enemy.' 'Oh,' said the Prince, 'let us stay here ten minutes and drink our coffee.' Before the ten minutes had passed the Zulus came upon them, and in the skirmish the Prince lost his life. His mother, the Empress Eugenie, when informed of the facts, in her anguish, said: 'That was his great mistake from his babyhood. He never wanted to go to bed at night in time, nor to arise in the morning. He was ever pleading for ten minutes more. When too sleepy to speak, he would lift up his little hands, and spread out his ten fingers, indicating that he wanted ten minutes more. On this account I sometimes called him "Mr. Ten Minutes."'

No. 163.

EQUAL TO THE OCCASION.—A man was one day brought before a judge charged with stealing a number of valuable articles from a tent. With his knife he had cut a hole in the canvas just large enough to admit his head and arm. His lawyer, finding it hopeless to prove his client innocent, set up a strange defence. He declared that only the man's head, shoulder, and right arm had been inside the tent, and that it would be manifestly unjust to sentence the whole body to imprisonment for an offence committed only by a part. The judge was equal to the occasion, and sentenced the prisoner's head, right arm, and shoulder to three months' imprisonment, remarking that he could do what he liked with the rest of his body.

No. 164.

HE NEVER LEARNT THAT.—'That's a knowing animal of yours,' said a young man to the keeper of an elephant. 'Very,' was the cool rejoinder. 'He performs strange tricks and antics, does he?' eyeing the animal through his eye-glass. 'Surprising!' retorted the keeper. 'We've learnt him to put money in that box you see far away up there. Try him with half-a-crown.' One was handed to the elephant, and sure enough he took it in his trunk and placed it in a box high up out of reach. 'Well, that's very extraordinary—astonishing, truly. He can take it out again, of course?' 'We never learnt him that,' returned the keeper, and then turned to stir up the monkeys.

No. 165.

THE BOY AND HIGHWAYMAN.—Many years ago a boy had been to the market to sell a cow, and was returning with the money in his pocket, when a highwayman stopped him in a quiet part of the road, and demanded the money. The lad instantly took to his heels and ran away as fast as he could. The robber, who was on horseback, galloped after him, and quickly stopped him; but the boy took the money out of his pocket, and scattered it on the ground. The man began to pick up the gold, and while so engaged, the boy suddenly leaped into the empty saddle and rode swiftly away. The robber thus lost his horse; and when the boy arrived home, he found in the saddle-bags twelve pounds in gold, and two loaded pistols.

No. 166.

A LUDICROUS INCIDENT.—A ludicrous street incident occurred the other day. A young nurse-girl wheeling a baby-carriage started to cross the street, but finding herself in front of an omnibus, and hemmed in by a hansom cab coming the other way, she forsook her charge and fled with a scream back to the pathway. Then ensued great excitement. Every woman within sight shrieked, the drivers yelled, and the omnibus driver stopped his vehicle within about a foot of the baby-carriage, which was rescued by two or three brave men. Tenderly they carried it back to the pathway, and an anxious woman lifted the dainty blanket to see if the baby was still alive. But there was no baby, and all this feeling had been expended over a few pounds of potatoes and a bundle of celery that the nurse-girl had been wheeling.

No. 167.

HE WAS THE MAN.—On one occasion a settler waited on the governor of a gaol to ask for the loan of a prisoner to help him in shingling his house. 'Come to me in six weeks, when harvest is over,' said the governor, 'and I will find a man for you.' At the end of that period the settler, whose reputation for laziness was well established, again presented himself. 'Have you shingled your house?' asked the governor. 'Oh, dear, no! I've been waiting for help.' 'Well, go into that room, and you will see your man.' Presently the settler returned saying he could find no man, although he had looked all over the room, even under the table and behind the sofa. 'Not find him!' said the governor. 'How can that be? Come along with me, and I'll soon find him for you.' The governor led the man up to the large mirror over the mantelpiece. 'There's the man to shingle your house,' said he. 'Take him with you quick, and see that he does it.'

No. 168.

THE POWER OF IMAGINATION.—One Christmas, a gentleman offered to make all the windows of the parish church appear like real stained glass, and right successfully did he accomplish his work, but unfortunately fell short of material, and left a small triangular space in one window unfilled with the coloured designs. It was too late to obtain more material. On the following Sunday, an old gentleman came to church and sat near the unfinished window. During the service he frequently turned round, and, casting furtive glances at the apparently broken pane, moved very cautiously away. The following Sunday he again attended the church, and was being conducted to the same seat, when he turned to the sidesman and exclaimed: 'What! have you not got that window mended yet? I have been in bed all the week from a cold I caught near that window last Sunday. Kindly put me somewhere else.' The official, laughing to himself at the joke, showed the gentleman to a comfortable corner, and faithfully promised that it should be attended to.

No. 169.

JENNY LIND'S RIVAL.—Here is a pretty story of Jenny Lind. One day she was riding in the country with some friends. A bird of brilliant plumage perched on a tree near by as they drove slowly along, and trilled out such sweet notes as astonished her. The coach stopped, and reaching out she gave one of her finest warbles. The beautiful bird arched its head on one side and listened; then, as if to excel its famous rival, raised his graceful throat and sang a song of rippling melody that made Jenny rapturously clap her hands in ecstasy. Then quickly, as though she were before a severely critical audience, she gave some Tyrolean mountain strains that set the echoes flying, whereupon little birdie took it up, and sang and trilled, till Jenny, in happy delight, acknowledged that the pretty woodland warbler decidedly outcarolled the Swedish nightingale.

No. 170.

A QUEER MEAL.—A woman once entered a tap-room where her husband was sitting with a companion. Placing a covered dish which she had brought with her upon the table, she said—'Presuming, husband, that you are too busy to come home to dinner, I have brought you yours.' She then departed. With a forced laugh the husband invited his friend to dine with him, but on removing the cover from the dish found only a slip of paper, on which was written: 'I hope you will enjoy your meal; it is the same your family have at home.' It is said that man never entered a public house again.

No. 171.

A PATHETIC STORY.—The following incident happened this year. A little girl between ten and eleven, with something in her apron, called at one of the branch offices of a pawnbroker. 'What have you got?' inquired the shopman. The poor child made a brave effort to restrain her tears, and said: 'Papa is ill, and so is mamma. The chemist wants half-a-crown for a bottle of medicine, so I thought——' 'I don't want to hear about that, child; what have you come to pledge?' 'I've brought this, sir, if you will be so kind——' And, unfolding her apron, she took out her doll. The pawnbroker was touched, and without waiting to have it valued, he said to the child: 'Here are four shillings; will you take them?' Pawnbrokers are not so completely case-hardened as one might imagine.

No 172.

THE LATE PRINCE AND THE BEGGAR.—In 1890 the late Duke of Clarence, then Prince Albert Victor, visited Newcastle, and was present at the races. While passing along one of the streets accompanied by two or three town dignitaries, a ragged, haggard man accosted the party, and solicited alms. One of those present waved the intruder away, but the Prince, with a smile, interposed. 'Stay! do not turn him away,' he said. 'Let us hear what he has to say.' The company were silent, and the man immediately launched out into a recital of his woes. He had a sick wife, and had been ailing himself and out of work. Some members of the party scouted the idea; but the Prince, with a kindly glance at the wretched figure before him, drew out a sovereign and sent the poor man away happy. A little incident of this kind, however insignificant it may seem, proved that the heart of the late Duke of Clarence was in the right place.

No 173.

THE CAT AND THE CRAB.—A fisherman had one day caught a large crab, which he put into his basket along with his other fish. His house was very near the water, so he jumped out of his boat, took his basket, and put it down at his own door, and then went back to look after drying his nets. An inquisitive cat came out of the house and began smelling at the fish-basket. Presently it put its paw in to steal one. But no sooner did the thief's paw get down to the fish than it was gripped fast by the crab. The cat howled with pain, and pulled out its foot quickly enough, with the crab hanging to it. When the crab touched the ground it left loose the paw, and running down to the water escaped. Pussy thus did the crab a good turn by setting it free, but ever afterwards the cat always ran away when it saw a live lobster or crab.

No. 174.

THE NOBLE ENGLISHMAN.—A wealthy Englishman had gone to a hairdresser's, where he noticed a young woman, very poorly clad, engaged in earnest conversation with the owner of the establishment. She was offering to sell him her magnificent head of hair for ten florins, whilst he refused to give more than eight for it. At last the poor girl consented, with tears in her eyes, to accept the latter price, when the Englishman interposed with 'Wait a moment.' He inquired the young woman's reasons for parting with her hair, and was told that her parents, formerly well-to-do, were now actually starving. Then the noble Englishman produced a couple of bank notes and said: 'Will you allow me to purchase your hair?' The young woman replied in the affirmative, without even looking at the sum offered, whereupon he delicately abstracted a single hair from the girl's head, put it in his pocket-book and left the shop. On being informed that the notes represented the value of £200 she burst into tears—this time tears of joy, for her parents were saved from want.

No. 175.

ADVENTURE ON A LOCOMOTIVE.—A curious adventure happened the other day to an inspector of the Indian Midland Railway. As he was travelling on the line, seated on the front part of an engine, he noticed in front of him a large number of vultures collecting and evidently disputing over some object, which, as the engine drew near, proved to be the carcass of a jackal, probably killed by a passing train. The locomotive, with the inspector in front, charged in among these birds, who seemed determined to abide by their prey. The result was, that while some were killed, others of them were thrown against the inspector, whom they straightway proceeded to attack in a most vicious manner, tearing his clothes, and inflicting considerable wounds on his hands and face. He was able, however, to retain his position on the engine, and to defend himself from further injury, and he considers himself fortunate in escaping without anything more serious happening.

No. 176.

QUARRELLING.—In the depth of a forest lived two foxes, who never had a cross word with each other. One of them said one day, in the politest fox language: 'Let's quarrel.' 'Very well,' said the other, 'as you please, dear friend; but how shall we set about it?' 'Oh, it cannot be difficult,' said fox number one. 'Two-legged people fall out; why should not we?' So they tried all sorts of ways, but it could not be done, because each would give way. At last number one brought two stones. 'There,' said he, 'you say they're yours and I'll say they're mine, and we will quarrel and fight and scratch. Now I'll begin. These stones are mine.' 'Very well,' answered the other gently, 'you are welcome to them.' 'But we shall never quarrel at this rate,' cried the other, jumping up and licking his face. 'You old simpleton, don't you know that it takes two to make a quarrel any day?'

No. 177.

THE INFLUENCE OF A CHILD.—A large and ferocious mastiff broke its chain, escaped from its master's house, and ran along the road near the city of Bath. The people were filled with alarm, dreading a bite from such a mad dog. A fine little boy, who was playing on the road, having a stick in his hand, struck the dog as it raced furiously past him. The dog turned back upon its assailant. The little fellow, far from being intimidated, ran to meet the enraged animal, and threw his arms lovingly about its neck. This soothed the dog, and it caressed the child in return.

No. 178.

A GENTLE REMINDER.—The chairman at a meeting recently resolved to allow each speaker ten minutes only. One after another delivered their speeches, when it came to the turn of a gentleman who was puzzled to know how he could gauge his speech so as not to last more than the appointed time. At last he hit upon an idea. Taking a pin from the corner of his waistcoat, he handed it to the chairman with the request that he should remind him when his time was up. The chairman promised to do so. The gentleman went on speaking for fifteen minutes before the chairman became aware that the speaker had exceeded his limit. According to promise, he gently applied the pin to the speaker's leg. No notice was taken, however, and the speaker went on. Thereupon the pin was pushed in a bit further. Still the speaker went on. Then the chairman stuck the pin in right up to the head, but, strange to say, it took no effect. The chairman, getting vexed, put his arms round the speaker and pulled him down. 'Why didn't you remind me?' asked the speaker. 'I did,' replied the chairman, 'and the pin is in your leg now right up to the head.' 'What? Where? Which leg?' exclaimed the speaker in an excited tone. 'Why, that one,' said the chairman, pointing to the leg into which he had pushed the pin. 'Oh,' said the speaker, 'I forgot to tell you that that was a cork one!'

No. 179.

HIS MISTAKE.—A shipload of fine horses was recently consigned from Calcutta to Bombay under the charge of a very honest but somewhat dull agent. While the horses were being landed at the slip they managed to break away from the men in charge, and ran like wild animals through the city. The agent caught one of them, and mounting him, gave chase. After several hours of exciting work, with the help of his men, he had captured all but one of the horses, as he counted them. Finally he made his reluctant way to the superintendent's office to give an account of the matter. The superintendent came to the door and listened to the story. 'And you say there were 124 horses in, and you have 80 of them in the company's stables and 43 in the steamer?' 'Yes, sir, all safe but one, and we cannot find him anywhere.' 'What is that horse you are riding? Have you counted him?' asked the superintendent. 'Well, I am a donkey! Of course this is one of them.' And the agent rode off in disgust, while the superintendent roared with laughter.

No 180.

A VERY CLEVER REPLY.—The Shah of Persia once asked a group of his courtiers whom they thought the greater man, himself, or his father. At first he could elicit no reply to so dangerous a question, the answer to which might cost them their heads. At last a wily old courtier said: 'Your father, sire; for though you are equal to your father in all other respects, in this he is superior to you—that he had a greater son than any you have.'

No. 181.

FAITHFUL 'CARLO.'—About three years ago an awful earthquake occurred. Among the many houses that were destroyed was one which belonged to a milkman who had a dog, Carlo, of whom he was very fond. When the house fell, the only person saved was the

dog, who would not leave the ruins of the house, and kept scratching at one particular spot. At first nobody took any notice, and thought Carlo was only amusing himself; but when after the second day he still persisted in trying to scratch up something which lay beneath the rubbish, even though they tried to entice him with food, at last some of the leading people of the town decided to examine the spot. This they did, and after digging for some time the body of the milkman was found, and on looking nearer they discovered that he was not quite dead, though very much hurt. They applied restoratives, and the man recovered consciousness. Carlo's joy was touching to see. All through the man's illness Carlo remained by his master's bed, or at his door, as if to guard. When the man got well his gratitude was very great, and he loved his dog so much, that though he was offered a large sum for Carlo he would not part with him.

NEW DICTATION TESTS.

Suitable for 'Unseen Tests' in Reading also.

STANDARD IV.

No. 130.

The sun was nearing its setting-point, when a group of boys and girls went gaily away for a farewell frolic. As the keen wind nipped fingers and toes as well as noses, down they went one after another on the various courses, one and all bubbling over with the innocent jollity of healthy exercise. People passing in the road below looked up and smiled at the red-cheeked boys and girls filling the frosty air with peals of laughter and cries of triumph.

No. 131.

Ten years ago the system was abolished whereby the public were to assist in the sorting of letters by placing those intended for London in one box, and those for the country in an adjoining one. In spite of this fact, the boxes still remain, and much trouble is taken by the public to carry out instructions which have long ceased to have practical application. The Post Office have at length resolved to remove this anomaly by substituting single letter-boxes for those now in use.

No. 132.

It is now thought that horses suffer a great deal from toothache. A veterinary surgeon says that many runaways, attributed to viciousness, are caused by this pain. Horses' teeth are very subject to decay, and no attention is paid to dentistry for their benefit, as ought to be the case. Thus it sometimes happens that the metal bit striking upon the exposed nerve of a tooth will set the animal wild in a moment, and start him off upon the run. In fact, for the time being, the poor beast is actually crazy, and not responsible for what he does.

No. 133.

Only use capital letters when they are required, punctuate carefully, and do not underline your words. You should be able to express yourself forcibly enough to make underlining unnecessary. It is not good taste to abbreviate your words. Paper is so cheap that crossed writing is inexcusable. The greater the care you bestow on your letter, the higher is the compliment you pay the friend to whom you are writing. First date your letter and write your full postal address; then if it fails to reach its destination it will be returned to you.

No. 134.

It is curious how articles which at first are despised as useless become not only valuable but almost indispensable commercially. This is the case with cotton-seed in America. For years it was burnt as useless refuse, but only by degrees have its various uses been recognised. Of these, the latest discovered is the value of the stalk, which was held unserviceable for man or beast, and which is now converted into a fibre from which paper is made. Thus the whole of the plant has been found to have its different uses.

No. 135.

Put a flannel in a soup plate by the dining-room window; keep it well wet, and lay seeds of cress on top of it. The young plants being supplied with water by their roots, and with carbon by the air around, have all they need, and grow and thrive in these conditions wonderfully. But if you were to cover them up with an air-tight glass case, so as to exclude fresh air, they would shrivel up at once for want of carbon, which is their solid food, as water is their liquid.

No. 136.

The Queen has her own tradesmen in every place where a Royal residence is to be found. The butcher and the fishmonger, the greengrocer and the poulterer make their morning call at the palace or the castle for orders, just the same as upon a private individual. Immediately after breakfast—which is usually a late one—the bill of fare is submitted to Her Majesty, and she either adds to it or crosses out a dish, as she may feel inclined.

No. 137.

A tiger made its appearance at an up-country station in India some time ago, and took possession of the place for several hours, seeming to enjoy the loose-gravel platform and the shelter the station afforded, much to the consternation of the staff, all of whom made themselves scarce with one exception. The native station-master, after carefully barricading himself in, sent the following telegram: 'Tiger jumping about platform; men will not work; please arrange.'

No. 138.

The Duke of Northumberland has probably the largest kitchen and certainly the most remarkable one in the country. It is more like a series of shops, and covers a big area. The meat department is a veritable butcher's shop, the corners devoted to poultry and vegetables would stock a good-sized poulterer's and greengrocer's. The staff employed is equally as large, the head of each department 'weighing out' the various condiments of the kitchen as a shopkeeper would to a customer.

No. 139.

In the high lands above the capital of a large province belonging to the French in Northern Africa, crickets or locusts, as they are generally called, put their bags of eggs into the sterile soil in July. The hot sun shining upon them slowly hatches them, and in the following spring a little white, innocent-looking caterpillar crawls out. It quickly grows into a cricket, and then these creatures collecting in hundreds of thousands march down in vast armies upon the cultivated lands, destroying all before them. Each cricket has in its mouth a pair of strong horny hooks which act like a pair of scissors.

No 140.

A funny fad of the mad King of Bavaria is mentioned in a paper. 'His insanity appears to have taken the form of an illusion that he is a stork. In one of the magnificent apartments devoted to his use at the palace he has laboriously constructed a gigantic nest, every stick and straw of which he has conveyed in his mouth to the spot. In that nest he squats almost the entire day, with feathers stuck in his long, thick hair and beard, while he chatters in imitation of the "clappering" of a stork whenever anyone approaches.'

No. 141.

Some of the eminent physicians of Paris were assembled about the death-bed of a celebrated doctor. To their expressions of grief at the expected loss to the profession, the dying man answered: 'Gentlemen, I shall leave behind me three excellent doctors to supply my absence.' Being pressed to name them, as each man expected to be included in the trio, he said, 'Water, Exercise, and Diet.'

No. 142.

The mole cricket is a clever little creature. A labourer was once mowing some grass by the side of a canal, and chanced to slice up a large piece of the turf, just cutting open the home of one. Such a pretty little chamber dug in the clay, it looked as if it had been moulded by an egg. Here there were a hundred eggs, the size and shape of caraway comfits. To make the nest secure, the mother had defended it like a fortified town, with entrenchments, ramparts, and covert ways. She has to guard against a wicked black beetle, who would gobble up all her eggs if he once got the chance.

No. 143.

The lobster is greatly in dread of thunder, and when the peals are very loud, numbers of them drop their claws and swim away for deeper water. Any great fright may also induce them to drop their claws. But new claws begin at once to grow, and in a short time

are as large as the old ones, and covered with hard shells. The lobster often drops its shell, when it hides until the new shell is hard enough to protect it.

No. 144.

A steam-roller was one day recently proceeding along High Street, when it suddenly got beyond the control of the driver, who had considerable difficulty in guiding it clear of the traffic. Finding that he was unable to cut off the steam, the man altered the course of the roller into an adjacent road, and the huge machine was eventually stopped by coming into contact with the kerb.

No. 145.

As a rule, Indian children are kindly dealt with, though sometimes one of twins is killed; and instances are known of boys being slain while girls are saved, because they can be sold in later life. However, these are quite exceptional customs. In many tribes it is looked upon as cruel, and as the proof of an unnatural mother, to whip a naughty child. So that we may take it that the cradles are rough and simple, because the parents are not wise enough to make better beds. We must not expect too much of the untutored savage.

STANDARDS V.-VII.

No. 114.

The chase of the kangaroo is undertaken variously—on horseback, with or without dogs, and by stalking, either with rifle or shotgun. A hunt on horseback is an exciting and often dangerous pastime. In timber, where it usually takes place, it is particularly hazardous, owing to fallen logs and low-set branches, which often sweep the incautious hunter over his horse's tail, and drop him in an undignified position on the ground behind. Firearms are not employed in this pursuit, and when the game is cornered it is killed by a blow from the butt end of a heavy riding-whip, or from a stirrup which is unshipped from the saddle for that purpose. The dogs used in the chase are a rough breed of large greyhounds, which have not only the strength necessary to pursue, but also to attack when he is brought to bay.

No. 115.

The anchovy is a small fish about three inches long, belonging to the herring family. It comes into the Mediterranean from the Atlantic in vast shoals for spawning, and is caught mostly in the months of May, June, and July. It is captured at night-time, when the small boats engaged in the fishery put out in numbers from the Italian shores, furnished at the stern with lights. These lights attract the fish in immense numbers, and they are literally ladled out of the water, for the operation can in no wise be termed fishing. The best ground is off a small island near Leghorn. This fish was in former times tolerably common off the English coast.

No. 116.

Increased facilities should be accorded to night-travellers—whether in the train itself or in the stoppage-stations does not greatly matter—for procuring simple and inexpensive refreshments, solid as well as liquid; particularly hot tea and coffee of good quality and at low prices during the winter months, and cool drinks at high summertide. In these matters, which may be said to minimise the discomfort and weariness of lengthy railway journeys, our railroad accommodation is excelled by that of every Continental country, not excluding Russia and Spain, which in other respects are far in arrear of British travelling arrangements.

No. 117.

Junior clerks—lads of sixteen and upwards—are continually required in mercantile houses in London and elsewhere; the custom in many firms being, when a clerk leaves their employ, to shift all those under him one step upward, and take a new 'junior' to begin, as it were, at the foot of the ladder, his duties at first not being very heavy. He has to copy letters; to act sometimes as messenger; to put away and bring out ledgers, etc.; and the qualifications he is expected to possess are:—Firstly, a good address and a neat appearance; secondly, a good handwriting; thirdly, some knowledge of accounts; and fourthly, a general aptitude to make himself useful and to learn. He is taken, not for what he is, but in expectation that he may turn out well.

No. 118.

One has heard nothing lately of the Watkin Tower, and most people were inclined to suppose that the project had fallen through. This, however, is far from being the case, and it appears that the work has been steadily going forward, the foundation of the tower being now completed, and the laying out of the grounds materially advanced. A number of members of Parliament will inspect the works on Saturday. One would have thought that the craze for towers of this pattern had died out after the novelty of the idea was exploded. But it is presumable, in consideration of what one knows of human nature, that wherever there is a fantastic eminence of any kind to be ascended, there any number of persons may be found only too anxious to toil to the summit, if so be that they can proclaim the fact to their friends.

No. 119.

In connection with the fatal collision which occurred at Bishopsgate Station, it is stated as a fact worthy of note, showing the advisability of training railway men in ambulance work, that ten minutes after the alarm was given, a staff of railway ambulance men were on the spot, and rendered valuable assistance in rescuing and tending the injured, afterwards conveying the more severely injured to the hospital, or accompanying those who had suffered less to their own homes. The railway servants who rendered this valuable aid had been trained by the St. John's Ambulance Association.

No. 120.

Experience has amply shown that the association of discharged prisoners has this certain result—that they talk together over their past lives and plan future mischief. Accordingly the method of the Royal Society for the Assistance of Discharged Prisoners is to send them promptly to work amidst honest surroundings, and so separate them at once and as completely as possible from each other and from their former associates. Arrangements have been made for providing remunerative work either in London or in the country for any ex-convicts physically capable and willing to labour. Some who are suited for a seafaring life are sent to the care of agents until ships can be found for them—a few selected cases are sent abroad; and it may be safely said that no released prisoner who seeks aid has any excuse for lapsing into crime from want of a fair start.

No. 121.

Charles Dickens seemed to be always ready for a ramble about London, a dinner at some place of note or curious retreat, an expedition to the sea-coast or pleasant country inn, or over the Channel to Paris or the Continent. He was the editor, busy with all details; the manager of private plays, himself the chief actor. He gave little suppers and little dinners. He was full of kind thoughts for others, and kind care of those who else had suffered sorely. He brewed all kinds of drinks, and was the prince of good fellows; and when nothing else would serve, he walked off for twenty or thirty miles into the country, or, again, travelled all night to fulfil an engagement to read, then hurried back to catch up a hundred threads in London.

No. 122.

If we take a broad survey of the Crystal Palace Exhibition, the first impression made is that the quality of the entire exhibition is good; and the company is to be congratulated on the general arrangements. Visitors have not been disturbed, but everything has been and is being got into place without any closing of the doors for a single day. The main contributions are placed in the central naves and in the large side spaces of the ground floor, and the smaller and lighter goods in the galleries. The principal plant of every kind is contributed by the manufacturers and Electrical Supply Companies, and the light articles by the ornamental brass workers; the former gasfitters, who have taken up the business of house-wiring and selling electroliers instead of gasaliers; and the decorators and furnishers.

No. 123.

While Lord Salisbury entered the world with immense social and accidental advantages over the vast majority of his fellow citizens, his bitterest enemy would not deny that his talents and ability have proved more than equal to the foremost place which he holds in the Government of the British Empire. Opinions may differ as to the wisdom of his administration and the consistency of his career. Nobody doubts his capacity for business or his powers of speech. And these are the two most valuable qualities for anyone who hopes to distinguish himself in the public life of this country. When he writes as well as he speaks, his success may be considered assured.

No. 124.

In Spain, a band of women robbers has been discovered by the police. They had their den in a cave on the outskirts of the town,

where they met on the first night of every month to plan burglaries. They had in the cave a full stock of burglars' tools, and about £600 worth of plunder which they had taken in towns within a radius of fifty miles. They did most of their work in men's attire, and several suits of men's clothes and false beards were found by the police at their rendezvous. This band has committed three highway robberies in the last year, and the crime which the police were tracing at the time of the discovery was a murder. Three of the women in the band are married and have children. Eight of them belong to the labouring class, one is the wife of a small tradesman, and the other is an agitator from Madrid.

No. 125.

That wheelbarrows should replace elephants as a means of transport seems curious. Yet elephant owners demand such exorbitant rates that the Chinese have abandoned transport by that animal, and have introduced wheelbarrows, which are cheap and work well on jungle paths. In one place they constitute a class of hackney carriages. The wheel is large and covered over, forming a seat on which the passenger sits, resting one toe in a loop of rope. Piles of merchandise are stowed on the barrow, and occasionally a man can be seen wheeling his whole family down the street. In the country districts they say the woman has to do the wheeling. Pigs and vegetables look better on a barrow.

No. 126.

The common mulberry has been so called because it prudently keeps its leaves folded in the bud until all danger of frost is past. And this, in the excessively changeable climate of ours, is a sign of the greatest possible wisdom in plant life. The mulberry is not a tree of large growth; it has crooked, irregular branches, which spread into a wide head, and the bark is of a lightish brown colour. The leaves are dark green, heart-shaped, rough, serrated at the edges, and supported on short stalks. The flowers are of a greenish white; the short catkins, male and female on the same plant, make their appearance about June. In England, the first mulberry trees are said to have been planted in 1548, and some of the original trees are believed to be still alive.

No. 127.

A number of gentlemen interested in social questions have, at the invitation of the Bishop of Durham, met to consider the subject of national insurance, and a circular issued by the Bishop states they have agreed that there is room for a scheme of national insurance, though not to interfere with other organisations already well founded. It is suggested that the scheme should be limited to a provision for old age and disablement, and for widows and children under the age of sixteen, provision for sickness by friendly or trade societies not to be interfered with. The scheme, it is suggested, should be compulsory, those persons who are members of recognised societies being exempt from its application. It is suggested that a minimum pension of five shillings per week be guaranteed by the scheme, the State and the employer contributing a portion of the premiums, the State guaranteeing all benefits.

No. 128.

Tea is undoubtedly one of the most desirable aliments known to the domestic economy. Apart from its nutritive and stimulative properties it has also remarkable medicinal virtues, having a powerful effect in the diminution for inflammatory diseases. On analysis, tea proves to be even a substitute for animal food. It has also been found by persons of sedentary habits to take the place of exercise, promoting the activity which it is supposed can only be obtained by physical movement. Many races in Central Asia live almost entirely on tea, and very sturdy they become on this strange diet, while our own soldiers, at the special command of Lord Wolseley, fought throughout the Egyptian War on no other stimulant than cold tea.

No. 129.

Assurances which have been already given should, it is thought, satisfy the discontented clerks that the fears which they entertained with respect to a disproportion of female labour were groundless. Underlying this grievance it is said was to be found the real suspicion that as time went on, the women, many of whom are well qualified, would be promoted to posts which are now remunerated at a higher rate than £350 a year, the maximum pay of the second-class division. These positions have hitherto been filled by departmental officers, unclassified, but whose appointments are not yet at all events open, as vacancies arise to clerks of the recently reconstructed second division. Possibly they might be under some future revision of the scheme.

COUNTY COUNCIL EXAMINATIONS.

The following two sets of Questions will at the present juncture be useful to many, and interesting to most of our readers, especially as County Councils are destined to become more and more Educational Authorities.

CHESHIRE COUNTY COUNCIL.

EXAMINATION IN COOKERY (THEORETICAL).

Saturday, June 18, 1892, from 10 a.m. to 1 p.m.

Examiner, Miss DODS, Principal of the Birmingham and Midland School of Cookery.

1. Name the combustible compounds, and mention their uses in the body.

2. Give a short description of the sugar-cane, and tell how the different qualities of sugar are obtained from it. How may it be distinguished from starch?

3. Describe the three ways of making dough into bread.

4. Give the composition of lentils, and point out the difference in chemical composition between such seeds as lentils, peas, etc., and the grain of the cereals. With what foods should pulse generally be eaten?

5. Give a full description of an egg from the shell inwards, and give the composition of the mixed yolk and white of a hen's egg. What is the difference in composition between an egg and an equal weight of butcher's meat?

6. What is the nutritive value of tea, coffee, and cocoa? What benefits does the system derive from them?

7. Name four dishes suitable for a first lesson to school children. Mention the chief nutritive qualities in the principal ingredients, and the probable cost of each dish.

8. Give recipes for three ways of making beef tea, and tell the advantages of each method.

9. Give full directions for boiling a piece of beef weighing 14 lbs., and say whether the same directions hold good in every case.

10. Which are the chief vegetables in season just now (June), and at what price may they be obtained?

11. Mention four common ways of cooking meat, and state the various advantages of each method.

12. What directions would you give school children as to the cleaning of the various cooking utensils?

CHESHIRE COUNTY COUNCIL.

EXAMINATION IN THE PRINCIPLES OF AGRICULTURE.

Saturday, June 18, 1892, from 10 a.m. to 1 p.m.

Examiner, Professor GILCHRIST, University College, Bangor.

1. *Six questions* ONLY *are to be attempted. You may select any of the questions.*

2. *The value attached to a full and correct answer to each question is placed in brackets.*

3. *Do not omit to fill in the Schedule Form attached to your paper.*

1. You are walking over a farm in September. What indications would assist you to form an estimate (*a*) of the natural fertility of the land, (*b*) of the manner in which the farm had been farmed within the past few years? [15]

2. How do soils lose and gain nitrogen, and in what conditions does nitrogen exist in the soil? [15]

3. Give a suitable rotation of crops for some farm with which you are acquainted, stating the district and the nature of the soil. What manures, stating quantities per acre, would you apply to each crop in the rotation? Mention the time at which you would apply the different manures. [20]

4. Discuss fully the different methods of sowing crops. State the amount of seed you would apply per acre, as well as the method of sowing, for the following crops:—Barley, Wheat, Beans, Mangels, Swedes. What are the conditions necessary for a good seed bed? [15]

5. State, shortly, your opinion of farmyard manure as a fertilizer. If you had no farmyard manure on a farm would you purchase manure of this nature or would you purchase artificial manure? Give reasons for your answer. [15]

6. Explain fully why drainage on the one hand, and irrigation on the other hand, are frequently of great advantage to the farmer. [15]

7. Describe the special points of any one breed of cattle. How have the laws of breeding been illustrated in the development of this particular breed? [15]

8. What amount (*a*) of milk, (*b*) of cream, (*c*) of butter, (*d*) of Cheshire cheese, might you expect a shorthorn cow to produce in one year? Indicate generally the food the cow would receive at different seasons of the year. During how many months of the year would you expect her to produce milk? [20]

9. 'Foods differ widely in their feeding and in their manurial values.' Examine and explain this statement. [15]

TACT
IN THE BUSINESS OF SCHOOL-KEEPING.

BY RICHARD BALCHIN.

THERE is a type of parent one often sees—the mother who firmly believes that her son, like the sovereign in our constitution, 'can do no wrong.' At home he always spoke the truth; never deceived anyone in his life; was so good to his sisters; and would keep the baby quiet for hours; in fact, she really believed he could not be a bad boy, even if he tried! Now, it is a singular thing that no schoolmaster living has ever met with the boy who 'could do no wrong.' We have, indeed, often come across the child, who through some inborn perversity could never by any possibility of himself do anything that was right. In such a case as this there *is* a virtue in the practice of goodness. Artemus Ward said he was certainly a better man than George Washington, for the latter *could not* tell a lie, whereas he (Artemus) *could*; 'he could tell a lot,' but he didn't; hence his greater virtue.

The schoolmaster finds that a very serious offence has been committed by one of two boys; it is not quite clear which, but everything seems to point out Jones as the criminal. But Mrs. Jones appears upon the scene, and flatly denies that *her* boy 'could ever have done such a thing.' Then it must have been Smith. But Mrs. Smith, who has heard of the cruel and wicked statements made about her boy, calls at the school, and produces three prizes which her Tommy has had from his Sunday school teacher; therefore it is absolutely certain that 'it was Jones who done it.'

In such a case as this, it is advisable that the two mothers should meet at the school, and cross-question the two boys. The master should stand and watch. Then will happen one of those charming little incidents which so happily tend to enliven the dull routine of a teacher's life. The women will, at the outset, adopt a rigid, quiet, judicial tone, and look learned. It may be said of them as was once remarked of a famous judge, 'nobody ever could be *so* wise as Lord Eldon *looked*.' This initial stage, however, does not long continue. A most unfortunate reference is made by one parent to the home-life of the other. Sarcasm at once begins to take the place of argument. How bitterly sarcastic these people can be! The fun will soon be in full swing. Finally, the point of personal abuse is reached. The fury grows. The two astonished boys, now entirely ignored, regard the scene with very open-eyed bewilderment. The master now interposes; he decides that, as it appears very difficult to arrive at a satisfactory conclusion, he will 'look over the matter' this time, but should anything of the sort occur again, the mother shall be informed. And so the two parents are parted, care to be taken that they shall not both leave the premises at the same time.

THE PARENT WHO DISBELIEVES IN C.P.

I have become acquainted with this type of parent at the time of the admission of his son into the school. On such an occasion the father wishes the master to promise that on no account whatever shall corporal punishment be resorted to in the case of his son. Of course no such promise must be made. Every boy upon entering the school must fall under the rules and regulations in force for the maintenance of discipline. At the same time, the father, who is often a reasonable and kind man, should be told that the vast majority of the boys in the school are never punished in this way; a look, or a word of censure is enough; and the great probability is that his son will be among this majority, especially as he appears to have the advantage of living in a well-ordered home, so that he need have but very little fear of the use of the cane in his case. In *this* father you have a very high type of parental management. But there are other instances where the opposition to corporal punishment does not arise from such an exalted ideal. I have known two such types. In the first, you have an ultra-Radical and Socialist, one who regards all rules and laws as so many symbols of a tyrannical predominance, and all punishments for breaches of these, as acts of brutality. This man's son is generally a mischievous little rogue, impudent, idle, and self-willed. It is soon discovered that he has never really been made to obey, and he is not long in school before a sound thrashing becomes an absolute necessity. This is the sort of father that summonses the teacher at a police-court.

In the second type you have the extremely religious, gloomy, and narrow man; often a prominent member of the local Salvation Army. He makes the faults and failings of his son 'the subject of earnest prayer,' and does not believe in any other way; and if his boy is bad now, he will change and become good 'in God's own time,' and not before; so there is no use in trying to make things better by any such human agency as 'the cane.' The usual result of this home-training is that the teacher finds in his class an unmitigated little sneak, a contemptible hypocrite, one who cheats in his play, and practises dishonesty in his work. There is only one way of treating this boy. Every act that is not perfectly straightforward must receive its due punishment. Also, every occasion on which any other boy in the class shows conspicuous honesty and manliness should be privately laid open in all its beauty before this unfortunate lad, so that he may in time come to see that there is something brave and good in actions that are quite straight and aboveboard.

My next sketch will deal with 'Tact in the Management of Managers.' And we will lead off with 'the fussy, meddlesome manager, generally a retired tradesman.'

I'LL TRY AGAIN!

Moderato.
1st & 2nd TREBLES.
BASS.
1. A lit - tle in - sect in a cell The lone - ly cap - tive taught, As
Key F. Moderato.
1st S.
2nd S.
B.
1. A lit - tle in - sect in a cell The lone - ly cap - tive taught, As
climb - ing still, though oft it fell, It gained the height it sought. "I'll
C.t.
climb-ing still, though oft it fell, It gained the height it sought. "I'll
f.F.
not re - pine at my dis - tress, Nor of de - feat com - plain; 'Tis pa - tient toil in -
not re - pine at my dis - tress, Nor of de - feat com- plain; 'Tis pa - tient toil in -
- sures suc - cess, And so I'll try a - gain, And so I'll try a - gain!
sures suc - cess, And so I'll try a - gain, And so I'll try a - gain!

2. The farmer sows the furrowed field
With faithfulness and care,
And hopes the mellow soil will yield
A harvest rich and rare.
Should storms arise and tempests blight
The still ungarnered grain,
He may be troubled at the sight,
But says, "I'll try again,"
But says, "I'll try again!"

3. And thus should we with cheerfulness
Our daily work perform,
Though fortune fail to smile or bless,
And disappointments swarm:
The cloud will vanish by-and-by—
The sun dispel the rain;
And we must never mope and sigh,
But try and try again,
But try and try again!

SCHOLARSHIP FRENCH.

BY W. T. THOMPSON, B.A. (LOND.),

Honours at Matriculation, with Marks qualifying for Third Prize; First Class French Honours, with Marks qualifying for the Prize; Second Class German Honours; Co-Director of the Birkbeck Training Classes.

IN commencing the present series of papers on 'Scholarship French' we should like all our readers to understand that our aim is not simply to enable students to secure good marks in French at the examination next year, but to help them to read French with greater intelligence, ease, and pleasure.

We use the word 'help' advisedly, because a solid knowledge of any subject cannot be acquired unless strenuous efforts are put forth by the pupil himself. To these efforts the work of the teacher is auxiliary. He can direct his pupil's efforts into proper channels, and prevent that waste of exertion which is a consequence of the lack of direction, while at the same time he can, by the explanations he gives, render the work less wearisome and more effective. But no student can hope to meet with any but moderate success who does not work regularly and systematically at the subject studied.

Before commencing any detailed explanations of the Scholarship Author, we shall shortly describe the nature of the assistance we mean to give, and then furnish some directions *which must be carefully followed* by those who make use of these papers. We can guarantee that any student who follows out carefully and systematically the directions we shall give will do well in French at the examination, and will be laying a good foundation for a wider knowledge of French hereafter.

These papers will contain :—

1. Explanations of difficult words, constructions, and idioms.
2. Parsing of irregular verbs.
3. Specimens of translation into good literary English.
4. Typical examination questions and papers with answers to them.

It is advisable that every student should, before commencing these papers, have a thorough knowledge of the terminations of the regular verbs. These should be revised once a week *at least*. The following rules of French grammar need to be carefully borne in mind, as they are those *which are most frequently lost sight of by young students*.

A. Adjectives agree with their substantives, in number and gender, as la fille est petit*e* ; les garçons sont grand*s* ; les plumes sont petit*es*.

B. The present participle *is not used with the verb 'to be' in French*, except when employed purely in an adjective sense, as 'les fleurs sont charmant*es*.' Here *charmantes* is purely an adjective. But in the sentence 'The boys are playing,' the present participle helps to build up the compound verb 'are playing.' In this case we must mentally turn the sentence into 'The boys play,' and translate it *les garçons jouent*.

C. The past participle, used with the verb 'to be' (être), agrees with the subject to that verb in number and gender, as 'nous sommes venu*s*,' 'we are *or* have come' ; 'les lettres sont écrit*es*,' 'the letters are written.'

D. The past participle used with 'to have' (*avoir*), or with 'to be' (être), when by the next rule it replaces *avoir*, agrees in number and gender with the direct object of the verb, if that direct object precedes it, as, 'les femmes que j'ai vu*es*,' the women whom I have seen. Here the direct object is the relative pronoun *que*, which is feminine plural because its antecedent *femmes* is feminine plural.

E. (1) The compound tenses of reflexive verbs (like *s'habiller*, to dress one's self) are formed with *être* and not *avoir*.

(2) The pronoun which immediately precedes the verb in these compound tenses is the direct object of the verb, and by the preceding rule the past participle agrees with it in number and gender. Example: *Les hommes se sont habillés*, the men have dressed themselves. The participle *habillés* is masculine plural because the direct object *se* (= *hommes*) is masculine plural and precedes it.

F. The subjunctive mood is used *mainly* in the sentences following and depending on :—

(1) Impersonal expressions, like *il est juste*, it is right.

(2) Verbs used negatively or interrogatively.

(3) Verbs expressing an emotion of the mind, as *to be glad, to be sorry*.

(4) Verbs expressing a wish, command, doubt, caution, or prohibition.

(5) Certain conjunctions.

(6) Superlatives, and expressions like *seul*, *unique*, and only, which are practically superlatives.

In this and in future papers we shall refer to these rules by their numbers. Bear in mind they are simply the rules *mainly lost sight of by beginners*.

To make a proper use of these papers it is essential that students should—

(1) Get Darqué's Juxtalinear Translation of *La Jeune Sibérienne*. It is published by Hughes and Co., and its price is marked at 2s. This edition should be used, as we shall refer to the words and phrases to be explained by the pages and lines where they appear in it.

(2) Interleave your copy, and write short summaries of the notes in this series of papers opposite the pages in the book to which they have reference.

(3) In copying down any new French noun you come across, *always write its gender after it*.

(4) Always write the accents, if any, on the vowels. *This is most important.*

(5) Try to grasp the meaning and force of every word, if possible, of the author. Do not be satisfied with having simply a general idea of the meaning of any passage you are reading. Aim *first* at being able to give a good literal translation expressing the sense of the author. *A good literal translation which shows a knowledge of the constructions used is better than an elegant translation, which is after all only a paraphrase of the author.* In finally revising the author you will be able to give more literary merit to your rendering.

(6) Do not avail yourself of the help of the translation while you are reading for the first time. If you do you will lose a great deal of the benefit you might get from these papers. The Inspector who examines your French paper will be sharp enough to see whether or not you intelligently comprehend your author, and will mark you accordingly. In January, 1893, begin reading your author again, and correct your rendering by referring to the excellent translation of Professor Darqué.

(7) When the translation of a passage presents difficulties which you cannot surmount, leave it for a few days and then come back to it again. If you cannot master the difficulty then, write to the Editor of this paper, *clearly describing your difficulty and giving the page on which it occurs.* Mark on the outside of your letter, 'Scholarship French,' and enclose a *stamped directed envelope.* You will receive within a few days an answer which will most probably clear up your difficulty.

Students who have not a French dictionary are advised to get Cassell's. It is the best French dictionary of its kind.

NOTES AND VOCABULARY TO 'LA JEUNE SIBÉRIENNE.'

The first letter refers to the page, the second to the line in Darqué's Juxtalinear Translation where the word or phrase is found.

5.1.—*vers.*, prep.; towards (of place or time).

5.2.—*fin*, noun, fem., sing.; end.

5.2.—*règne*, noun, masc., sing.; reign.

5.2.—*partit.*, preterite ind., 3rd, sing. of *partir*; set out.

5.3.—*pour venir*; to come. When an infinitive, as here, denotes purpose, it is preceded by *pour*.

5.5.—*fit*, pret., ind., 3rd sing. of *faire*; make.

5.9.—*qui l'ont connue*, who have known her, *or* who knew her. *ont*, pres. ind., 3rd, plur. of *avoir*; have. *Connue*, past part., fem., sing. of *connaître*; know. *Connaître*, is to know, be acquainted with (a person). *Savoir*, is to know a thing which one has heard or learned.

The participle is fem., sing., by rule D, the direct object l' (*la* = *voyageuse*) being feminine.

Notice particularly how to distinguish between *le*, *la*, and *les* when representing the article *the*, and when standing for the direct object of the 3rd pers. pro. When used in this latter sense they are *invariably followed directly by a verb.*

5.9.—*paraissent*, pres., ind., 3rd, sing. of *paraître*; appear.

5.9.—*ait*, pres., subj., 3rd, sing. of *avoir;* have. Subj. in accordance with rule F. 3.

5.10.—*prêté*, past part. of *prêter*; lend, ascribe.

5.11.—*romanesques*, adj., fem., plur. (agreeing with *idées*); romantic.

5.12—*eut*, pret., ind., 3rd, sing. of *avoir;* have.

5.12.—*d'autre passion*, any other passion. *De* after a negative (*ne — jamais*, never) = any.

5.14.—*appui*, noun, masc.; support.

5.16.—*la force de l'exécuter*, the strength to accomplish it—*l'* (*la* = *action*) is a pronoun for the reason stated in the note on p. 5.9.

5.17.—*récit*, noun, masc.; story, narrative.

5.17.—*offre*, pres., ind., 3rd, sing. of *offrir;* offer.

5.18.—*que—romancier*, which a novel writer can inspire. *Romancier* is the subject, and *peut inspirer* the predicate.

5.18.—*peut*, pres., ind., 3rd, sing of *pouvoir*; be able.

5.20.—*lira*, fut, 3rd, sing. of *lire;* read.

5.20.—*peut-être*, perhaps (literally—*maybe.*)

5.21.—*histoire*, noun, fem; story.

5.22.—*par elle-même*, in itself.

5.24.—*la vérité*, truth. Abstract nouns are accompanied by an article in French.

5.25.—*nom*, noun, masc.; name.

5.27.—*naquit*, pret., ind., 3rd, sing., of *naître*; be born.

5.27.—*le hasard des circonstances*, the accident of circumstances. The *e* of *le* is not elided (as in *l'homme*, the man), as *hasard* commences with an aspirated *h.*

5.28.—*conduit*, past part. of *conduire;* lead.

5.28.—*housards*, noun, masc.; hussars.

5.29.—*noir* masc., *noire* fem.; black.

5.30.—*il ne tarda pas à les quitter. Tarder* is *to be slow.* Literally, the passage means, 'he was not slow to leave them, *i.e.*, 'he soon left them.'

5.31.—*pour venir.* See note on 5.3.

5.31.—*en*, to, with names of countries, but *à*, to, with names of towns; *e.g.*, *pour venir à Londres*, in order to come to London.

5.31.—*se marier* is *to get married. Marier* without the *se* means *to cause to be married*, and is used of the parents or guardians. *Le père a marié sa fille* = 'the father has got his daughter married,' *i.e.*, has made a match for her.

6.1.—*reprit*, pret., ind., 3rd, sing., of *reprendre;* take again.

6.1.—*ensuite*, afterwards.

6.2.—*carrière*, noun, fem.; career.

6.3.—*fit.* See note on 5.5.

6.3.—*plusieurs*, several. This word is used only in the plural, and has the same form for both masc. and fem.

6.4.—*Il s'était trouvé*, lit. he had found himself, *i.e.*, he had been. See Rule E (1).

6.7.—*On ignore—Sibérie*, lit. 'one does not know the cause of his exile to Siberia.' *Ignorer* = not to know, be ignorant of.

6.8.—*procès*, noun, masc.; trial.

6.9.—*en* is here the pronoun (= of it) and not the preposition. This word can easily be distinguished in its two uses by the following rule. If a finite verb (*i.e.*, any part of the verb except the infinitive mood and participles) *follows* en *immediately*, the word is a pronoun. If a present participle, or any part of speech but the verb in a finite form follows it, *en* is a preposition.

6.10.—*dans la suite*, lit. in the result, *i.e.*, afterwards. *Suite* = what follows, from *suivre*, to follow.

6.10.—*ayant*, pres. part. of *avoir;* have. *Ayant* is *not* the present participle of *avoir*, but a preposition = before.

6.10.—*été*, past. part. of *être;* to be.

6.10.—*tenu*, past. part. of *tenir;* hold, keep.

6.12.—*mis en jugement*, lit. 'put in judgment,' *i.e.*, brought to trial. *Mis* past. part. of *mettre;* put.

6.13.—*Malveillance*, noun, fem.; ill-will.

6.14.—*Quoi qu'il en soit*, lit. 'whatever it be of it.' The *en*, which is the pronoun (See 6.9), is not translated into English.

Translate 'whatever be the case':—

Quoi que, pro., whatever.
Quoique, conj., although.

Both these expressions are followed by the subjunctive *soit*, pres., subj., 3rd, sing. of *être;* to be.

6.17.—*près des frontières*, *près de*, near; *prêt*, adj., ready; *prêt*, noun; a loan.

6.18.—*vivant*, pres. part. of *vivre*; to live. But 'to live' in the sense of 'reside' is *demeurer*; *Je demeure à Londres* = I reside in London.

6.19.—*de* with *vivre* = on.

6.19.—*modique*, adj., m. and f.; small, scanty.

6.19.—*rétribution*, noun, fem.; allowance.

6.20.—*assignée*, past part., fem., sing. of *assigner*; assign. Agrees like an adj., with *rétribution.*

6.21.—*condamnés*, condemned, past part., masc., plur., because used with *sont* (part of ob, *être*); and therefore agreeing with the subject *qui* (= *prisonniers*). Rule C.

6.22.—*travaux*, plur. of *travail*, noun, masc.; work.

6.25.—*en aidant*; by helping. Read note on 6.9 again.

6.25.—*blanchisseuses*, noun, fem., plur.; washer-women. *Blanchisseuse* is from *blanchir*, to wash, lit. *to whiten* (*blanc*, white.)

6.26.—*moissonneurs*, noun, masc., plur.; reapers.

6.26.—*prenant*, pres. part. of *prendre*; take.

6.28.—*Dont—s'occuper* lit. 'of which her strength permitted to her to occupy herself; *i.e.*, 'which her strength permitted her to undertake.'
permettaient, imperf., 3rd, plur. of *permettre*; permit.

6.29.—*blé*, noun, masc.; wheat.

6.30.—*œufs*, noun, masc., plur.; eggs.

6.31.—*arrivée*, arrived. The participle is fem., sing., because referring to Prascovie.

6.32.—*enfance*, noun, fem., sing.; childhood. It is, although feminine, preceded by *son*, because it commences with a vowel.

6.32.—*n'—aucune* = no, as an adj.
n'ayant aucune idée; having no idea.

6.34.—*bien de la peine*; much trouble. *Bien*, as an adv. of quantity, requires both *de* and the article before the noun; while *peu*, *moins*, etc., require only *de*.

6.36.—*fermées*, past part., fem., plur., because used with *été* (past part. of *être*), and therefore having to agree with the fem., plur., subj., *mains*, hands. See Rule C.

6.37.—*d'autres occupations*, lit. 'some other occupations;' but 'some' is most frequently left unexpressed in English. *De* = partitive adj. 'some' or 'any' when an adjective precedes the noun.

7.1.—*tout entière aux soins*, 'quite engrossed in the cares.' *Tout* = the adverb 'quite' when it precedes a qualifying adjective.

7.1.—*ménage*, noun, masc.; household.

7.2.—*prendre—situation*, lit. 'to take her deplorable situation in patience.'

7.4.—*dès*, prep., denoting time, from, since. Do not confound it with *des*, of the, or *dés*, plur., noun, masc.; thimbles.

7.4.—*jeunesse*, noun, fem., sing.; youth.

7.5.—*pouvait*, imperf., ind., 3rd, sing., of *pouvoir*; be able.

7.6.—*souvent*, adv.; often.

7.6.—*à des accès*, lit. 'to some fits.' Do not translate 'some.' See note on 6.37.

7.7.—*l'excès même*, the very excess. *Le même excès*, the same excess. *Même l'excès*, even the excess. Notice how 'même' changes its meaning with its position.

7.8.—*saurait*, condit, 3rd, sing., of *savoir*, know. *Ne saurait justifier*, lit. 'would not know (how) to justify.' Translate it, 'could not justify.'

7.9.—*évité*, avoided. Subj. is here used after *quoique*, although. Rule F (5).

OUR FIRST MANUAL EXAMINATION.

(London School Board.)

The Inspector, with two colleagues, arrived about 2.15 p.m., the Drawing Examination having been held in the morning. He commenced by examining the work performed during the year, taking note of the exercises, joints, and models made.

The teacher was then questioned on the following subjects:—

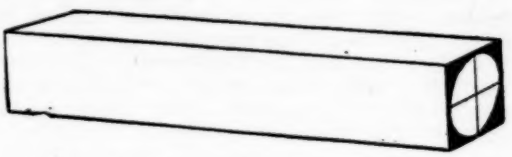
1. Were the boys taught to sharpen their tools, and set planes ready for working?
2. Were lectures given on woods and growth of trees, and were specimens used to illustrate the lectures?
3. Were demonstration lessons given?
4. Were the boys made to draw the exercises before working them?

The Inspector next went carefully through a number of the drawing books, particularly noticing if the dimensions were put down. In the Isometric drawing, he suggested that the two parts of a joint should be shown apart as well as together.

At 3 p.m. the teacher was told to parade the boys and arrange them in three divisions, according to capability. There were seventy-two present, and the Inspector chose fourteen from the 1st section, twelve from the 2nd, and ten from the 3rd.

The manual-room has bench accommodation for twenty. Those who could not work at the bench had to mark out a line on a plank 9″ wide, and saw to the line for about a yard, the Inspector noticing if the sawing was kept straight to the mark.

Two boys were set to make a round ruler or dowell each from a piece of wood 12″ × by 1¼ square, the ruler being 1″ diameter when finished.

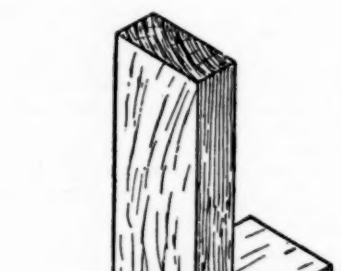


Dowell—End view ready for working.

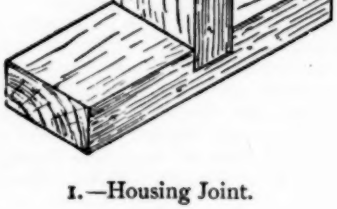
The remainder each had a piece of wood 12″ × 2¼ × ⅞. This had to be planed up to 2″ × ¾, and to test sawing, 1″ was to be cut off from one end. A joint had then to be made by each boy from his piece of planed wood.

The following were the exercises given.

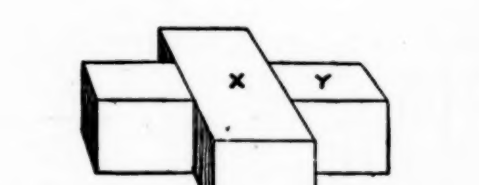
12 boys had to do the Housing Joint.
3 " " " Angle Bridle Joint.
3 " " " Lapped Halving Joint.
2 " " " Corner Lapped Halving Joint.
1 boy " " a simple Mitre Joint, the mitre cut being left from the saw.



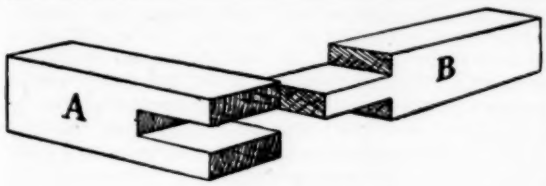
1.—Housing Joint.



2.—Lapped Halving Joint.



3.—Corner Lapped Halving.



4.—Angle Bridle Joint.

5.—Mitre Joint.

Twenty-two attendances were required for payment to be made. All names had to be entered on the schedule, and all were presented to the Inspector, whether they had made twenty-two attendances or not. On examining the registers, the Inspector said the Managers must occasionally test and sign them.

The Inspectors left about 5.45 p.m.

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EDUCATION IN LITERATURE.

BY THOS. CARTWRIGHT, B.A., B.SC. (LOND.)

In this month's *Westminster Review* we have a very interesting article from the pen of a German teacher, which indicates that in Prussia an attempt is being made to re-introduce in schools two of the most prolific sources of pedagogic discontent, viz., denominationalism and untrained inspectors.

This reorganisation of Prussian primary schools has caused the resignation of no less than four Ministers of Public Worship and Education since 1872. Always, we are told, has this question been looked at from a political, never from a pedagogic point of view, and the writer proceeds to state that the aim of his article is 'to describe the present state of primary schools in Prussia, and to analyse the various and trenchant proposals of the recent Primary Education Bill in their intentions and consequences.' This Bill was brought through the Prussian Diet by Count von Zedlitz, and caused his resignation. The importance of the proposals is shown by the fact that there was a five days' debate upon them in the Diet, that they formed the chief topic in every journal, and were the cause of a popular movement against the Bill throughout Prussia and even Germany. Popular condemnation in Prussia was the inevitable result of a Bill which was directly opposed to 'the historical tendency of the development of Prussian schools.' In other German states a similar onslaught on the schools has been made by clerics, and sympathy with Prussia was proportionately wide and deep.

Then follows an interesting little sketch of the evolution of the 'Volksschule' (Primary School), in order to demonstrate that the school is the work of the State and not of the Church. By his 'General-landschulreglement,' issued in 1763, Frederick the Great inaugurated the compulsory education of every Prussian child, the aim of which is thus laid down: 'The Primary School is to be established in order to put a stop to the most noxious and, for Christianity, unbecoming ignorance, and to bring up abler and better subjects for the future.' Prussian law, consequently, knows neither the denominational nor the undenominational school; but simply recognises the Volksschule. The teacher is bound to give religious instruction in conformity with the doctrines and teaching of his own Church.

This system, which is thus historically demonstrated to be the offspring of the State, has flourished in spite of many and varied attacks upon it. In 1854, by the enaction of the 'three Regulations,' a 'certain indistinct relation between Church and State' was achieved. Of far greater import were the 'General Regulations,' carried by Falk in 1872, which established the school in absolute independency of the Church, making the State its master. 'This,' says Herr Reutter, approvingly, 'was the time of political and religious rationalism.' In 1878 there were relapses. 'There were also,' naïvely adds the writer, 'two attacks upon the life of William I.' Bismarck's protective and socialistic measures were at this time being given to an ungrateful world, and in place of a Liberal-Conservative Government the country was given over to the tender mercies of an Ultramontane-Conservative Party. Puttkammer received the portfolio of Falk, and the clerics at once resumed the attack upon the school; but

> The best laid schemes o' mice and men
> Gang aft a-gley,

and success so far has shown no anxiety to crown their efforts.

Herr Reutter next sets out in order the present connection between Church and School in Prussia. 'The clergyman of the parish is not, *per se*, School Inspector, as, for example, in Wurtemburg. As clergyman, he has to give religious instruction twice weekly, but he has no right to interfere in school affairs. If he is nominated by the Government as a Local or District Inspector of Schools, he is recognised as merely an official of the State. Every primary school is supervised by the parish which elects the School Board; above that is the District Government with its representative, the District School Inspector, and, lastly, the Ministry. The District School Inspector is the most important personage in the administration and direction of schools, and is nominated by the State.'

By the 'General Regulations' the Government was free to elect whom it pleased as D.S.I., provided he passed the qualifying examination. Dr. Falk appointed 'worldly' D.S.I.; but, after 1878, the tendency was in the opposite direction, and 'reverends' were most frequently appointed, until at the present time, of the 546 D.S.I., five out of six are pastors; hence the Church might well be expected to be satisfied, especially as no complaint can be made as to the facilities open to them for imparting religious instruction; but no, like Oliver Twist, but without his excuse, they ask for more.

The outcome of the proposals of Zedlitz would be 'to enchance and change the position between Church and State.' Amongst them are found no regulations for the securing of efficiency. In modern times the supervision of schools has been delegated to 'a professional man, a member of the class of teachers, and he has been given far-teaching rights which are only

circumscribed by a Government Committee. Would that we in England might say this of our system of Inspection. In Zedlitz's Bill, continues Herr Reutter, no regulations definitive of the education, position, rights and duties of the D.S.I. are to be found. Like a *deus ex machinâ* he appears suddenly at the top of the School Committee of a parish. Although the Bill does not directly say with whom the State has to deal, as her superintendent, the words 'but if the Local School Inspector is at the same time the clergyman who gives religious instruction' clearly show that the intention was to 're-establish the broken and crumbling bulwark of clerical local supervision round the school-house.'

Of 34,000 departments, 7,000 are under professional direction, and an order of Zedlitz's predecessor said that 'clerical local supervision should cease in the larger schools of several classes.' Zedlitz does not want more technical and professional knowledge and would destroy the connection between external and internal schools affairs, and the chief effect of Arts. 53 and 56 would be that an official of administration would be the chief of the School Board in each district, which would form an illustration of Prussian bureaucracy *par excellence*.

The question, into whose hands shall the destiny of the school and its teachers be given, is a vitally important one. A century has been spent in the stuggle for independence. An army without well-trained officers is powerless, and good laws are ineffectual in the hands of an inefficient staff.

School reformers never neglected to provide supervision answering all demands, and exercised by a member of the teaching profession. School supervision has become pedagogic and technical, and the rising of an independent, thinking class of teachers, and the wonderful development of the pedagogic and the technic, are consequences of this as is shown by the schools of Baden and Saxony, which are free from the clerics and, by consequence, are in the van of progress.

'The school to schoolmen' is the Prussian teacher's demand, as it has been that of his Austrian and French *confrère*. We may add that it is also the English schoolmaster's battle-cry, and that any Government should refuse to give full effect to this legitimate and just aspiration is a crying example of the crass obtuseness and wilful perversity of the bureaucrat.

The second important part of the Zedlitz proposals refers to religious instruction. At present the curriculum comprises Bible History and Reading, Catechism and the learning of 300 passages from the Bible and twenty-five hymns. The first three parts of Luther's Short Catechism, together with Luther's Notes, must be committed to memory. On each Saturday the teacher reads and explains the lessons of the following Sunday.

Herr Reutter complains, and by quotation illustrates, that much of this instruction consists of the in-cramming of empty meaningless words. This is not enough for Zedlitz. He would tincture every lesson with denominationalism, so that Protestant Geography, Roman Catholic History, and Jewish Natural Science must replace the unbiassed and unadulterated article. It is this 'denomination principle' which is most pronounced in the proposals and which has been most attacked.

The parish, in cases where there are thirty children differing in denomination from the rest of the scholars, may establish a new school to be taught by a teacher whose creed is that of the thirty. If the number of such children be sixty, the parish has no option—it must establish such a school; moreover, there must be separate religious teaching for any fifteen children belonging to one of the recognised religious bodies, which are Lutherans, Calvinists, Roman Catholics, and Freemasons (*sic*). Other denominations are dissident, such as Quakers, Mormonites, and Freethinkers, the children of whom are only exempt from denominational instruction if the 'parent proves that his children receive a sufficient religious instruction from a teacher of his own belief.' A teacher cannot be at a school of different denomination from his own, and the religious instruction is supervised by the denominational committee, of which the pastor is the representative, who may be present at the religious instruction, may ask questions, and, if not satisfied, may afterwards correct the teacher.

If the parish do not establish a minority school, the District Government may do so, and the parish must contribute towards its support. It is evident that such a school, with one teacher for all the classes, could not be so efficient as the larger school with its increased staff; hence only a part of the minority might elect to use the new school, which would thus run the risk of being suppressed. To avoid this, Art. 2 graciously informs us that 'as a rule' (in der Regel) children belonging to the minority denomination will not be *compelled* to attend the minority school. Such compulsion could, however, be applied to prevent the suppression of a badly-attended minority school, and herein is the iniquity. 'But,' says Herr Reutter, 'the most heinous proposal is to be found in Art. 17, which forces children not of a denomination recognised by the State as a religious community to partake of the religious instruction of a recognised denomination,' which would be grandmotherly legislation with a vengeance. This is upheld by some charming examples of that kind of fallacy known as 'specious reasoning.' 'The concession of the right of religious creed does not include the right of no creed.'

'Needs the school religion, then it needs Christendom.'

This cannot be conceived without denominations, and, to provide this, the State needs connection with denominations.

'This,' says Chancellor Caprivi, its author, 'is an unassailable syllogism.' Notwithstanding this statement it is assailable at every point, says Reutter, confounding, as it does, morality with (sectarian) religion. In this opinion he fortifies himself by quoting Ziegler and Virchow among moderns, and J. S. Mill and Basedow, who, following the lines of Rousseau and Comenius, 'provided a religious and moral instruction of which Christians, Jews, and Mohammedans could alike partake'; furthermore, the teaching of Béneke and Herbart 'point the same moral and adorn the same tale.'

These proposals, if followed out, would sow the 'seed of religious hatred and discord.' In addition, the action is prompted, not by a desire for the educational or religious welfare of the people, but, just as forty years ago the aid of the Church was invoked 'to transform the fermenting dragon's poison of Liberalism into the milk of a pious opinion,' so now we have 'the struggle for the command and power over the minds of men, which it was intended to hand over to clerical authority because the Prussian Government thinks that the

Church will convert believers of dogmas into good subjects.' In a word, the proposals are a would-be panacea for Socialism.

Dr. von Bosse is the successor of Zedlitz, and it remains to be seen whether his remoulding and alteration will be sufficiently sweeping to blot out the grave defects insisted upon by Herr Reutter, who concludes his logical and expressive article in the following words:—'To look forward, the aim of that educational policy, which is in accord with scientific pedagogy, is the parish communal school. The mingling of the population has rendered a denominational State impossible; it will, in the long run, render impossible the denominational school. The more the conditions and relations of the State are altered by the movement of the population, which in our days is so rapid and so intense, the demand of the schools will be increased, the more obvious will become the impossibility of providing special schools for the followers of special denominations, and the more conspicuous will it be to every individual that it would be an unjust lavishness to keep up two or three sectarian schools in a parish where one common institution, with several parallel and progressive classes, would flourish and produce better and more satisfactory results at a smaller expense.' The general conditions press towards this aim, and it is to be hoped that the unlimited introduction of the parochial communal school is only a question of time. How far Prussia is from this aim we cannot say; but in a retrospective view of this Education Bill we may well keep in mind Lessing's words:—'Go thy imperceptible pace, Eternal Providence! But do not let me doubt of thee because of its imperceptibility; do not let me despair of thee, if even thy pace to me appears to be going backwards! It is not true that the shortest line is always the straight one.'

Fraternal greetings to you, O Prussian pedagogues, and may you be eminently successful in keeping 'school for schoolmen,' and in repulsing and routing the demon Sectarianism.

In the *Revue Pedagogique*, Dr. Damain gives a chatty *résumé* of the report of Dr. Mangenot, who was sent by the French Minister of Instruction, in the autumn of last year, to examine London schools from the hygienic standpoint. The somewhat pretentious exterior of London Board Schools is thus referred to by the worthy doctor:—'L'aspect extérieur architectural des écoles anglaises est fait pour jeter le trouble dans l'esprit d'un bon hygiéniste.' Surprise is expressed that in a city, which is not 'cabinned, cribbed, and confined' by walls, the price of land should be so prohibitive as to compel the building of schools in two or three stories 'dans lesquelles la bizarrerie de l'aspect n'exclut pas toujours une certaine élégance, et qui parfois semble même avoir préoccupé l'architecte.' Still progress has decidedly been made, as is proved from the comparison of Gideon Road and Holden Street, dating from 1876, with Plough Road and Richard Street, built in 1890 'les dernières ont realisé de nombreux perfectionnements inconnus jusqu'alors.'

'In principle,' continues the writer, '10 square feet of superficial area are allowed to each scholar; but various causes result in making practice deviate from this salutary rule. Amongst good points are (1) Remoteness from noise and insanitary surroundings. (London teachers will appreciate this.) (2) The quality of the bricks and the existence of a foundation of 'ciment ou bitume melangé de gravier.' (John Lobb will appreciate this). (3) The doors open outwards, thus affording no obstacle to escape in the case of panic or fire. (4) The staircases are of stone, and landing places are frequent. (5) The combined lavatory-cloak-rooms (*Vestiaire-lavabo*) are well praised, and quite a little homily is preached on the well-known text:—'Pas de propreté pas de santé' and the English practice of tubbing, or bathing.

'Pas de propreté pas de santé' est un vieux proverbe, et cette fois la sagesse des nations avait encore raison. Il faudrait, dès la plus tendre enfance, habituer les écoliers à cette idée que les grandes ablutions sont de première necessité dans la vie.' Hence the doctor recommends frequent washing of hands to get rid of the sweat, dust, and ink which impede the action of the skin. With respect to the 'tub,' Dr. Damain thus delivers himself: 'Dans ce rapport l'usage du "tub" qui existe depuis si longtemps chez les Anglais, meritait de s'acclimatiser plus vite et surtout plus généralement parmi tous ceux qui ont quelque soin de leur santé'; and a report of Dr. Douglas Hogg, dated twenty-fourth of February, 1892, is mentioned as affording 'une étude comparative des plus minutieuses et des plus edifiantes sur ce qui se fait actuellement dans les principals "public schools" de l'Angleterre, de l'Ecosse et d'Irlande.'

A strong recommendation is made that brushes and head-gear should never be used in common because of the resultant head diseases of the 'scurf' genus. The London school is again praised for its 1½ yards of enamelled bricks extending upwards from the floor, its hard unwaxed, wooden floors, its ceilings painted in oils, and other arrangements which facilitate disinfection, which should be periodical, on the 'prevention is better than cure' principle. English desks, which, by movement of seat or otherwise, permit room for simple physical exercises, are commended, and the practice of short lessons, with such exercises sandwiched in between them, are strongly recommended to the doctor's readers. As he well says—'C'est peu, mais cela suffit pour dégourdir les petits membres fatigués.' The need for proper lighting is strongly emphasised. 'Que les pupitres soient fixés ou mobiles, ainsi que les bancs qui les accompagnent, la façon de les éclairer est un des côtés les plus importants de l'hygiène scolaire. Combien d'affections de la vue contractées à l'école! Quel est celui parmi les myopes, qui n'a pas, vingt fois, maudit et accusé le temps ou il pâlissait sur Ovide et Cicéron à la clarté indecisive du jour ou à la lumière trop crue du gaz! Il serait si simple, pourtant, d'avoir un éclairage presque parfait—une classe en parallelograme, des fenêtres percées dans le plus long côté et à gauche des élèves. C'est le docteur Liebreich qui, après avoir énumeré les troubles fonctionnels de la vision, contractés pendant l'enfance, a donné cette description sommaire d'une classe d'école idéalement eclairée. Et il ajoute: Il existe, à peine, une école en Angleterre où ces règles soient observées d'une façon à peu près parfaite.'

In France, thanks to M. Trélat, this point has been kept well to the front.

A word as to the admirable system of flushing the W.C's. (a Frenchman would be bound to declare in our favour here) leads to the mention, in most approving terms, of two innovations, viz., the appointment of a School Board Medical Officer and the notification by teachers of any outbreak of disease in their schools, and, after a few valedictory remarks, pleasantly im-

pressing upon teachers the absolute necessity for giving due importance to hygienic considerations, the worthy doctor lays on one side his pen, in which respect we cannot do better than imitate him.

—o—

MODEL ANSWERS TO PUPIL TEACHERS' QUESTIONS.

9th APRIL, 1892.

History.

FIRST YEAR.

1. Name any authors during the first ten centuries who wrote about Britain, or who lived in Britain, and say what they wrote.

(*a*) *Strabo* (who died A.D. 25) speaks of the Phoenicians engrossing the tin supplies of Britain.

(*b*) *Tacitus*, son-in-law of Agricola, both in his life of 'Agricola,' and his 'Annals,' speaks especially of the period during which his father-in-law was governor.

(*c*) *Monks* of Winchester, Peterborough, and Canterbury wrote the *Anglo-Saxon Chronicle* from the middle of the sixth to the middle of the twelfth century.

(*d*) Other historical writers are *Albinus*, *Bede*, *Beretwald*, *Eddius*, *Felix*, *Willebad*, *Alfred the Great*, *Asser*, *Bricfirth*, *Lantfrid*. The writings of some of these were merely fragmentary, and of others almost legendary.

(*e*) Portions of such *British* writers as Gildas, Aneurin, and Taliesin are still extant.

2. Richborough, Bamborough, Bath, Chester, Edinburgh, London. Show the importance of these places in early times.

Richborough (Rutupiae) an old Roman town and one of the nine Coloniae, situated on the east coast of Kent, although now some distance inland was formerly famous for its oysters and as a port for continental trade.

Bamborough, in the north of Northumberland, was one of the 'bridles' of Scotland.

Bath (Aquae Solis), another of the Coloniae, was famous for its thermal springs, and its position on the great strategic thoroughfare, Icknield Street.

Chester (Deva) in Roman, Saxon, and Norman times was important on account of its border situation relative to Wales; and its position on Watling Street and the Dee.

Edinburgh, on the Vallum Antonini and the Firth of Forth, marked in Roman times the most northerly limit of permanent Roman conquest, and in later periods the boundary between Saxon and Celt.

London (Londinium) also one of the Coloniae, on the Thames and Watling Street, was of immense importance on account of its commercial and military convenience as regards the Continent. It must be remembered that for hundreds of years the Thames was a political boundary.

3. What portions of the country were most influenced by British, Danish, and Saxon occupation respectively? How are any of the local names a guide in this?

(*a*) *British.*—All the western portions of the island were a refuge from the invading Saxon. Names containing such constituents as Aber, Gwent, Llan, Tre, Pol, Pen, denote the tenacity of British occupation.

(*b*) *Danish.*—East Anglia, Northumbria, and all Britain north of the Thames except the Celtic portions retain abiding relics of Danish supremacy. Danish or Scandinavian names of places, such as *by* (= town), *e.g.*, Grimsby; *-ey* (= island) as in Sheppey, and *Dan* (= dane), *e.g.*, Danby, are common.

(*c*) *Saxons.*—The country south of or to the immediate north of the Thames preserved most distinctly all its Saxon characteristics, and was the least frequently overrun by the Danes. Such names as Wessex, Middlesex, Sussex, and Essex still obtain.

4. Give any particulars that you can of the early Irish and Roman missionaries in England.

(*a*) *Irish Missionaries.*—There is no doubt that after the relapse into Heathendom subsequent to and consequent upon the successful invasion of the Saxon pagans that the Irish were the *first* to reintroduce Christianity into these realms. Many Irish priests had settled at Iona, and thence issued many missionaries to North Wales, Northumbria and Mercia.

(*b*) *Roman Missionaries.*—In A.D. 596 the famous St. Augustine was sent over by Gregory the Great to attempt the conversion of the English. He was very successful in Kent, as were also Paulinus and Melitus, but they failed to secure the supremacy of Papal Authority. This was, however, accomplished by Theodore of Tarsus in 673.

5. Which do you consider the three most important battles in the period of history you have studied, and why?

(*a*) *Suetonius' victory over Boadicea* (61), for thereby the Roman Domination was secured.

(*b*) *Ethandune* (878) secured Saxon instead of Danish supremacy.

(*c*) *Brunanburh* (937) established the unity of England.

SECOND YEAR.

1. Give a short account of Lanfranc and of Anselm.

(*a*) *Lanfranc*, a native of Pavia, was appointed Abbot of Becin in 1044. In 1066 he was promoted by William I. to be Archbishop of Canterbury in lieu of the deposed Saxon Primate, Stigand. He was a man of considerable attainments and great artistic taste. Chiefly through his energy and initiation Canterbury Cathedral was rebuilt. By him William II. obtained the throne instead of Robert (1087). Two years later he died aged 84.

(*b*) *Anselm*, a native of Aosta, succeeded Lanfranc both as Abbot of Bec and Archbishop of Canterbury. Soon he came into conflict with Rufus respecting the king's misappropriation of the episcopal revenues, and fearing for his life, he withdrew to Rome in 1097. He returned at the accession of Henry I., and mediated between him and Robert, but in 1103 he again withdrew to Rome on account of refusing to receive investiture from the king. Three years after the dispute was settled, and Anselm returned to die in 1109, aged 76.

2. On what occasions, and with what results, do we hear of the Scotch invading England?

DATES			RESULTS
937	(Constantine)	...	Defeated at Brunanburh
1091	(Malcolm III.)	...	Repulsed
1131	(David I.)	...	Defeated at Northallerton
1174	(William (III.)	...	Defeated at Alnwick, and king captured
1318	(Robert Bruce)	...	Scotch retreated with much plunder
1346	(David II.)	...	Defeated at Nevil's Cross and king captured
1355	(David II.)	...	Scotch captured Berwick, but Edward III. retook it immediately.
1402	(Robert III.)	...	Defeated at Nesbit Moor and Homildon Hill
1496	(James IV.)	...	Scotch retired with much plunder
1513	(James IV.)	...	Scotch defeated and king killed
1542	(James V.)	...	Scotch defeated at Solway Moss
1640	(Charles I.)	...	English and Royalist vanguard defeated at Newburn
1643	(Charles I.)	...	Scotch materially assist the Parliamentary forces
1648	(Charles I.)	...	Defeated by Cromwell at Preston
1651	(Charles II.)	...	Defeated by Cromwell at Worcester
1745	(Young Pretender)		Advanced to Derby, but was compelled to retreat to Culloden, where he was decisively defeated

3. What were the main provisions of the Treaties of Wallingford, Bretigny, and Troyes?

(*a*) *The Treaty of Wallingford* or Winchester (1153) provided that:—

Stephen should adopt Henry as his son, to take upon his death the kingdom of England:—

Stephen's son William should be confirmed in all the lands and honours of his father before he became king:—

The earls and barons of both parties should do homage to their leader of their opponents:—

The inhabitants of boroughs and garrisons of castles should do fealty to Henry:—

The commanders of the principal fortresses should give hostages to Henry:—and

The bishops and abbots should swear fealty to Henry, and enforce the treaty by ecclesiastical censures.

(*b*) *The Treaty of Bretigny*, or, 'The Great Peace' (1360)—
Fixed the ransom of John of France at 3,000,000 crowns:—
Ceded Normandy, Touraine, Maine, and Anjou to France:—and
Gave to Edward III. Poitou, Guienne, Calais, and Ponthieu as independent fiefs.

(*c*) The Treaty of Troyes, or 'The Perpetual Peace' (1420) arranged that Henry V.:—
Should marry Katherine, daughter of Charles VI.:—
Be Regent of France during the lifetime of his father-in-law, and
Become king at his death.

4. Show how the fear of Papal power influenced legislation under any of our sovereigns.

(a) The Constitution of Clarendon (1164) provided that ecclesiastics should be amenable to the ordinary law of the land.

(*b*) *Statute 'De Religiosis'* (1246) aimed at preventing Papal ownership of English lands.

(*c*) *Statute of Provisors* (1344) prevented the Pope appointing to English sees or benefices.

(*d*) *Statute of Praemunire* (1393) treated those as outlaws who should in any way invoke the Pope's power against the king's.

(*e*) A *Series of Acts* (1534) put ecclesiastical supremacy entirely in the hands of Henry VIII.

(*f*) An Act (*1559*) restored to the crown the ancient jurisdiction over the State, ecclesiastical and spiritual, and abolished all foreign power repugnant to the same.

(5) Say briefly how armies, ships, and money were raised under the Plantagenets.

Armies.—By the '*Assize of Arms*' (1181) every English freeman according to his social rank was made a soldier, and was bound to provide himself with suitable armour for service within the realm. This was merely the revival of a very ancient Saxon custom.

By the institution of *Scutage* the king could be paid two marks as a commutation in lieu of military service.

Ships were raised by requisition upon the seaports, and sometimes even upon the maritime counties. It is questionable whether there was a national navy at all beyond the commercial one.

Money was raised by 'tallage,' by taxes upon wool, by feudal incidents, from the royal desmaines, from robbing the Jews, and from lawful grants.

THIRD YEAR.

1. Who were some of the great sailors under the Tudor sovereigns? Describe the objects and results of their voyages.

(*a*) Henry VII. patronised *Sebastian Cabot*, a merchant of Bristol, who in a voyage of discovery chanced upon Newfoundland, and subsequently (1497) coasted along the seaboard of North America. Though the king incorporated a commercial company under the name of the 'Merchant Adventurers,' he was too niggardly to afford much encouragement to a direct trade with the newly-discovered countries.

(*b*) In Elizabeth's reign (1577) Sir Francis Drake, starting from Plymouth with 5 ships and 164 men, doubled Cape Horn, and attacked the Spanish settlements on the west coast of South America. On his return he tried to reach home by the North of California; but finding no passage he sailed across the Pacific to the East Indies, and reached England round the Cape of Good Hope (1580), having circumnavigated the globe. He was the first Englishman to accomplish this feat.

On his arrival he was knighted by Elizabeth.

(*c*) *Sir Walter Raleigh* (1584) made an unsuccessful attempt to colonise Virginia; and in 1595 he sailed to Guiana, proceeded up the Orinoco, but failed to discover the gold for which he had come.

(*d*) *Frobisher* and *Davis* made several unsuccessful voyages to discover the North-West Passage.

(*e*) *Hawkins* explored the Guinea Coast, and commenced the Slave Trade.

2. What causes might dispose Elizabeth to hostility or peace with any of the Continental powers? Give an account of any dealings in her reign between England and France.

(*a*) Elizabeth was compelled by the force of circumstances to be the champion of Protestantism and of maritime liberty. On the other hand Spain was bigotedly Romanist, and jealous of any other nation entering the Pacific.

Naturally, therefore, England and Spain were at death-grips, and the former allied itself to such nations as Holland, that were endeavouring to shake off the Spanish yoke, and secure religious freedom. Alliances were also made with the Scandinavian powers, and the French Protestants were protected by Elizabeth, whilst in return the French assisted the Scotch Romanists.

(*b*) In 1559 the Treaty of Cateau-Cambresis, between England and France, settled the war begun under Mary. One article agreed that Calais should be restored to England, but this was intended as a mere sham to smooth English susceptibility.

In 1560 Elizabeth assisted to drive the French out of Scotland.

In 1572 occurred the horrible 'Massacre of St. Bartholomew,' in which 30,000 Huguenots were slain. The English nobles and gentry were so horrified, that to avenge it they offered to raise 26,000 men, transport them to France, and maintain them at their own expense.

However, Elizabeth was in so dubious a position, that she was unable to accede openly to their offer, and she contented herself with vigorous remonstrances and secret support of the Huguenots.

On the death of Charles IX. and accession of Henry III., Elizabeth assisted the latter, who was a Protestant, against the Romanists, both with men and money, sending over one expedition in 1590, and two others in 1591. These greatly assisted Henry III. in gaining the ultimate victory over the rebellious 'Leaguers.'

3. What was the Navigation Act, and what results had it?

The first *Navigation Act* in 1390 prohibited all exportation of merchandise except in English vessels.

The second *Navigation Act* in 1651 required European goods to be imported either in English ships or in ships belonging to the country of origin. It was intended not only to promote our own navigation but to strike a decisive blow at the naval power of the Dutch. Both these objects were attained. The Navigation Act was first modified in favour of the United States in 1815, and repealed in 1849.

4. Where are Marston Moor, Edgehill, and Newbury, and what importance had the battles that bear these names?

Marston Moor (1644) was fought in the middle of Yorkshire, and was noted for the decisive charges made by Cromwell's Ironsides.

Edgehill (1642), in Warwickshire, was the commencement of the Civil War or Great Rebellion.

Newbury (1643), in Berkshire, was famous for the death of Lord Falkland.

Newbury (1644) was altogether indecisive.

5. From what English kings might Henry VII., James I., William III., and George I. respectively trace their descent?

(*a*) *Henry VII.* was descended from Edward III.

Edward III.
|
John of Gaunt
Duke of Lancaster
|
Earl of Somerset
|
John Beaufort
|
Margaret Tudor
|
Henry VII.

(*b*) *James I.* was descended from Henry VII.

Henry VII.
|
Margaret
|
James V — Margaret
|
Mary Queen of Scots — Lord Darnley
|
James VI. of Scotland
(James I. of England)

(*c*) *William III.*

James I.
|
Charles I.
|
Mary (married William of Orange)
|
William III.

(*d*) *George I.*

James I.
|
Elizabeth, Electress Palatine
|
Sophia, Electress of Hanover
|
George I.

MODEL ANSWERS TO SCHOLARSHIP QUESTIONS, JULY, 1892.

Domestic Economy.

Friday, July 8th, 10 *to* 12.30.

Candidates are not allowed to answer more than *one* question in each section.

If you answer more than one question in each section, only the first answer in each will be revised.

SECTION I.—NEEDLEWORK.

1. Describe the principal articles of clothing made by hand-knitting, and show, by your statements, that instruction in the subject is of value to children in their school and home life.

(1) *Stockings and Socks.*—Although very good knitting is done now by machines, yet none is so durable, easily washed, warm and comfortable as that done by hand; children should especially be taught the knitting of stockings (as they require so many), and how properly to fit them. Only hand-knit stockings are quite sure to fit.

(2) *Vests.*—These wear and wash better, and are warmer than flannel. They may be knit with different kinds of wool, coarse or fine, white or coloured, and thus prove to be adapted to circumstances.

(3) *Wraps and Comforters.*—Warmth and durability are their great recommendation.

(4) *Knee-caps.*—These require to fit as in the case of stockings, therefore they are best hand-made.

(5) Knitted petticoats are cheap, pretty, and warm. The greatest advantage in hand-knitting is that of economy. Only the material is required, and no cost incurred in making. This applies to all the articles above named. Another value is that of industry. Knitting is easy, and does not require much attention; it may be picked up wherever there are a few minutes to spare, and so the knitter learns to utilise every moment.

2. Calico, flannel, and linen are extensively used in underclothing; give some account of the way in which these materials are produced. What considerations should guide you in selecting flannel for an infant's garments, and for men's shirts?

Calico is a species of cotton-cloth first manufactured at Calicut, in Madras, India. The bursting woolly pod of the cotton-plant is gathered, dried, picked from the seeds, and formed into bales. By various processes the cotton is drawn into threads, and then woven into calico.

Flannel is a soft fabric having a pile on one side. It is made from wool obtained from the sheep, which undergoes many processes, as sorting, scouring, washing, drying, carding, and spinning. This last process, as in cotton, brings the wool to the required fineness and firmness necessary for weaving.

Linen is a woven cloth made from the fibres in the stems of the flax plant.

Flannel, for an infant's garments, should be fine, or it may fret the tender skin; it should also be of a rather loose texture that it may not easily shrink—Saxony and fine Welsh flannel is much used for this purpose. Flannel for men's shirts may be coarser and stronger—Welsh flannels and the natural wool flannels are to be recommended.

SECTION II.—SAVINGS AND INVESTMENTS.

1. Describe the best forms of thrift (*a*) to be recommended in lessons to school children, (*b*) to be adopted by the teacher herself. Give reasons for your answer.

Thrift means much more than merely saving money. The term comprehends the due economy and utilisation of all our material resources.

(*a*) Children should be taught to be careful of their clothes, of furniture, and especially of food. They should learn not to waste scraps and remnants, and an impression might be produced upon them by describing to them how colossal fortunes have been accumulated from the residuals of manufactures.

Where there are no clothing-clubs or other local incentives for saving, offering generous bonuses, the children should be recommended to purchase stamps with their stray pennies, and after pasting them upon the form supplied, '*to open a Banking Account with Her Majesty*' when they have attached twelve stamps.

In most schools a penny bank is desirable.

(*b*) A school-mistress cannot afford to speculate with her scanty savings, and should avoid even such forms of investment as 'Building Societies,' unless they are exceptionally good. In general, it is impossible for her to invest enough money, so that retiring at 55 she can live upon the interest; therefore she must fall back upon a Post Office Annuity, which may be either immediate or deferred, according to her circumstances.

2. How would the sum of £20 be most properly expended in furnishing a labourer's cottage containing three rooms?

1. SITTING-ROOM.

	£	s.	d.
Carpet, Centre ..	1	10	0
Rug		7	6
Table..	1	0	0
Sofa	1	0	0
6 Windsor chairs ..		18	0
Fender and fire-irons		8	0
Easy-chair		10	0
Blind, curtains, etc ..		7	0
Book-shelves ..		10	0
	6	10	6

2. BEDROOM.

	£	s.	d.
Iron bedstead ..		15	0
Paliasse and mattress	1	5	0
Bolsters, pillows, etc.		10	6
4 Blankets	1	0	0
Counterpane ..		7	6
Dressing-table and wash-stand ..	1	0	0
Mirror		4	6
Chest of drawers ..	1	5	0
Carpet, 3 yds. ..		4	6
2 chairs		5	0
Blind, curtains, etc.		7	0
Toilet service ..		5	6
	7	9	6

3. KITCHEN.

	£	s.	d.
Fender and fire-irons		10	6
Two plain strong chairs		6	0
Table or dresser ..		12	6
Blind and lower curtain		3	6
	1	12	6

4. IRONMONGERY.

	£	s.	d.
6 knives and forks ..		4	6
2 tablespoons ..		1	9
3 dessert		1	3
6 teaspoons		1	6
Iron and wooden spoons		1	0
Tea and coffee-pots..		4	0
Trays		3	0
Frying-pan		1	0
Gridiron		1	0
Cruet-stand		4	6
3 Saucepans		5	0

IRONMONGERY (*Continued.*)

	£	s.	d.
Stew-pan and pot (or digester)		7	6
2 candlesticks ..		1	0
Kettle		2	6
3 buckets		3	0
2 washing-tubs ..		7	0
2 scrubbing-brushes..		1	9
3 blacking-brushes ..		1	9
3 blacklead-brushes..		2	0
Salt-box			6
2 flat-irons		1	6
Iron-stand			3
Coal-scuttle		1	3
Paste board and pin		2	0
Sweeping-broom ..		1	6
Hard (bass)			10
Carpet do.		1	2
Dripping and cake tins		5	0
Knife-board			6
Shovel		1	0
Hand brush			6
	3	11	0

5. GLASS AND EARTHENWARE.

	£	s.	d.
4 tumblers		1	0
½ doz. large cups and saucers		3	0
12 plates		2	6
Set of jugs		1	3
3 basins			9
Sugar basin and cream jug		1	0
4 meat-dishes ..		1	6
2 vegetable-dishes ..		1	4
Sauce-boat			8
4 pudding-dishes and bowls		2	0
Earthenware pan ..		1	0
Washing-up bowl ..			6
		16	6

	£	s.	d.
Sitting-room.. ..	6	10	6
Bedroom	7	9	6
Kitchen	1	12	6
Ironmongery ..	3	11	0
Glass and Earthenware		16	6
	20	0	0

NOTE.—This question is difficult to answer. Domestic Economy teaches that no house with a family should have less than two bedrooms; also that at least one room should be provided besides the kitchen, as all the work must be done in the latter. The choice of three rooms, therefore, either leaves out one bedroom or the sitting-room.

3. What rate of interest is allowed by the Post Office Savings Bank? Compute the sum which (including interest) would be saved in three years by a person who regularly placed 2s. a-week in the Post Office Savings Bank.

(*a*) Interest at the rate of two and a half per cent. per annum is given on every complete pound deposited, from the first day of the month next following the deposit till the 31st of December, when such interest is added to the principal and begins to carry interest.

(*b*) This is of course a very easy sum, but is far too long to be worked here in detail. Sufficient it is to say that the interest is ½d. per £ for each calendar month, and that care must be taken not to reckon interest on incomplete pounds. The savings amount approximately to £16 3s. Exact accuracy is precluded on account of insufficient details as regards particular dates of deposit.

SECTION III.—FOOD.

1. Give directions for roasting a piece of beef. Say by what signs you would know when it was properly cooked. How would you make the gravy?

Place the meat before a quick fire until the albumen on the outside is hardened and the juices thus arrested. Then move the joint back to a position where the meat will cook at a moderate heat. Baste constantly to keep the meat moist. The usual time taken is fifteen minutes for each pound of meat, but if the joint is over six pounds, the proportion must be lessened—*e.g.*, a piece weighing 14 lbs. would require to roast about 2½ to 2¾ hours. Five minutes before removing, dust over a little flour. To know when done, time must be the first test, then the steam from the meat will begin to burst outwards, also the meat will commence to leave the bone. The meat must not be allowed to look dry or scorched.

To make gravy.—Take some stock (or water), put in a small bunch of sweet herbs, salt and pepper to taste, a little sauce if liked, and colour with caramel. Let it come to the boil; then having poured off the fat from the dripping-tin, pour into the tin the contents of the saucepan; stir well and strain, pour some round the meat, the remainder into a tureen.

2. What are the chief purposes to be served by taking food? Name several articles of food which are respectively suited to serve each of these several purposes.

(1) To supply (in children) materials for the growth of all the tissues of the body.

(2) To repair the daily waste of skin, flesh, bone, blood, and nerve. The foods which serve these purposes are called flesh-formers, and because of their containing nitrogen, they are also called nitrogenous foods, as albumen in the white of egg; fibrin and gelatin in the lean of meat; gluten in wheat; casein in the curd of milk; and legumin in peas and beans.

(3) To keep up the natural heat of the body, and so supply force. These are carbonaceous and warmth-giving foods, and are supplied by starch in the cereals, potato, oatmeal, etc.; sugar and fat, which latter is found in the fat of meat, butter, etc.

(4) To harden the bones, teeth, and nails, and to purify the blood. Mineral foods, as salt, vegetables, fruits, and water supply this portion.

3. Why do persons who lead a sedentary life require less food than those who work in the open air?

Adult persons require food for two main purposes:—

(*a*) To supply the deficiency caused by waste, and

(*b*) To maintain the bodily heat.

All work causes waste, and the more severe the exertion, the more is the body expended. Accordingly, persons engaged in rough, heavy work, and, indeed, in almost any sort of manual labour, expend their tissue very freely; whilst a clerk sitting at a desk, and wielding no heavy tools, wastes but comparatively little of his bodily substance.

In the open air, too, there is a greater loss of heat than in the comfortably warm rooms in which sedentary persons work.

Therefore, the latter class requires neither so much tissue-producing nor heat-producing food as outdoor workers.

SECTION IV.—HEALTH AND SICKNESS.

1. What is meant by respiration? Describe the process and the use of it. Say also what common practices interfere with proper respiration, and how such practices may be corrected.

(*a*) *Respiration*, or breathing, includes both inspiration and expiration, both the inhaling of air and its exhalation. It is a mechanical process, but may be varied at will.

(*b*) Inspiration and expiration go on alternately, with a pause between each respiration. About 30 cubic inches is the ordinary amount of air dealt with in each process, but as much as 210 cubic inches can be respired by muscular exertion. The chief muscle of inspiration is the diaphragm, whilst the intercostals are muscles of expiration. When the diaphragm contracts it increases the longitudinal diameter of the chest, and into the increased thoracic cavity the air rushes through the trachea and bronchi into the lungs. These last are ramified with capillaries, through which the blood moves but slowly. Only a very fine membrane separates the blood from the oxygen contained in the air vesicles of the lungs; and through this membrane the blood receives the oxygen and yields up its carbonic acid gas. Without the supply of oxygen and the evacuation of the carbonic acid gas, the blood would soon become fatally vitiated.

(*c*) The practices interfering with proper breathing may roughly be classed under the heads of (1) Too tight clothing, (2) cramped postures, and (3) injudicious practices. Women do, and will, wear too tight stays, and men persist in being bound by too straight collars. Both sexes bring the shoulders too much forward, narrowing the chest, and sit 'in a heap,' constraining the diaphragm. Breathing through the mouth is an unhealthy practice, and smoking sometimes affects the lungs, and often the oxygen of the inspired air. The remedy for these '*interferences*' is common sense, and a disregard of fashion, together with watchfulness as to posture, and special breathing exercises through the nose during out-door walks.

2. How would you make a linseed poultice?

For poultices, the best crushed linseed is preferable to linseed-meal, as it contains all the oil; put water in a saucepan to boil, then sprinkle gradually in the crushed linseed, much in the same way as oatmeal porridge is made. When of the right consistency, which should be rather thin, boil for a few minutes to swell the linseed. Then spread on a cloth, or piece of rag, fold over the ends to keep in the linseed, and cover the side to be placed next the skin with thin muslin. Sometimes the doctor will require the linseed to be uncovered, especially if wanted for a wound, but this makes the poultice very awkward to adjust, and causes much bathing to be necessary. If the poultice is to stay on a long time, and is for warmth, and not drawing purposes, a teaspoonful of mustard is sometimes sprinkled over the mixture when spreading, or mixed with the linseed.

3. If a child in your school was severely scalded, what would you do? and why would you do it?

If the part scalded be covered with the dress, the clothing must be very quickly but gently removed, and cut off if necessary, in order to avoid breaking the skin or causing a chill. If the flesh be only red, the part must be covered quickly with flour. The great thing is to exclude the air. If the skin is blistered, apply lint or rag, dipped into a liniment made of olive oil and limewater. In removing this lint, which must either be changed or moistened often, great care must be taken to exclude the air. Two days afterwards the blisters may be pricked, but the skin must not be removed. If the scald were very severe, a medical man should be consulted as soon as the first relief is secured. The writer has often, in cases of burns and scalds, applied a large quantity of flour, which is always at hand, bound up the place, and as soon as linseed oil could be obtained poured it over the bandage until the flour was saturated, and repeated this for several hours, until the scald could be safely examined. Cold water is, as a rule, condemned; but in the case of a child upsetting boiling water over any portion of the dress, cold water should be poured on to prevent the further scalding by the hot clothes—especially if the water were over the feet, boots taking a long time to remove.

SECTION V.—CLOTHING AND WASHING.

1. What is the material of which soap is made?

The materials employed in the manufacture of soap are tallow, palm-oil, cocoanut-oil, resin, oleic acid, whale-oil, seal-oil, linseed-oil, etc., and caustic ley.

The fats or oils are obtained partly from animals and partly from vegetables.

The caustic ley is prepared by mixing together wood ashes (carbonate of potash), and lime, and lixiviating the mass with water, when a double decomposition takes place, resulting in the production of caustic, potash, and carbonate of lime.

A soda ley is also prepared by similarly treating carbonate of soda with lime.

Common salt is also added at one stage of the process.

Mottled soaps are produced by mixing mineral colouring matter with the soap during a certain stage of the hardening.

Toilet soaps are produced by perfuming the best ordinary curd soap with essential oils; or sometimes by saponifying lard, beef-marrow, or oil of sweet almonds with caustic soda ley, in the cold, and perfuming the products.

2. Describe the order and method of carrying out a weekly washing in a poor man's house.

Washing should be done early in the week in order that drying, folding, ironing, etc., may not be about when other work must be done. Care should be taken that it be done while the workers of the family are absent; if it be a very large one, it is better to divide it between two days; the flannels and coloured clothes may be done on the Monday, and the remainder on Tuesday. Tuesday is chosen as the washing-day to give a day for preparation.

(1) Sort the clothes into the following heaps:—Flannels, coloured articles, white calico and linen, grey calico and the cleaner towels, tea-towels and dusters. Table-cloths must be placed with the white articles if bleached. Sheets should be placed by themselves.

(2) Put to soak in slightly warm water and powder all linen, except any that may be only partially soiled.

(3) If the flannels and prints, etc., be done on the Monday, the clothes might be dollied through the soapy water used for these, and so be partly prepared for the Tuesday; they should be left in soak. Flannels should be washed in a soap lather, the water not being very hot; then in a second water with soap jelly dissolved in it, and finally well rinsed in warm water and put out at once. Coloured articles should be rinsed in cold water, with salt or alum to retain the colour.

(4) On the Tuesday the fire should be under the boiler early. The cleanest articles must be taken first, rubbed or dollied, the dirtiest parts soaped; then put into the boiler, with soap or powder, to boil for twenty minutes. When put in, the boiling should be checked, or any stains would become fixed. They should then be taken from the boiler, the soiled parts again rubbed, and finally the whole rinsed in cold blue-water. The remainder of the clothes should undergo the same process, putting in the sheets, or grey ones, second; then the towels, and finally the dusters; one lot being rubbed and rinsed while the others are boiling. Any articles that are greasy should be boiled with soda.

(5) The folding, ironing of handkerchiefs, starching and ironing of coloured things, may be done towards the evening of the washing day.

(6) All the remainder of the ironing should be quite finished, the things aired and all put away on the Wednesday at the latest.

This mode of carrying out the washing will do for a large family, and supposing the wife has all to do.

3. What is the difference between linen and cotton? Say for what purposes, and when, either is to be preferred to the other?

Linen is woven from the fibres in the stems of the flax plant. It is a good conductor of heat, and is therefore not so warm to the body as cotton, but is very durable when of a good quality. In summer it is suitable for underclothing, sheets, and pillow-slips. It is chiefly used for table-linen, because of its smooth, glossy surface.

Cotton is obtained from the pod of the cotton plant. Being of a woolly texture, as an article of clothing it is soft and comfortable. It is not so good a conductor of heat as linen, and therefore keeps the body warmer. Nor is it nearly so expensive as linen in its first cost, and is more easily washed. Underclothing made of cotton is best for regular wear, and in cold weather for bed-linen also. In summer time it is suitable for dresses, and for working dresses is to be recommended throughout the year on account of its being easily washed.

Arithmetic.

MEN CANDIDATES.

Wednesday, July 6th, 10 to 1.

Candidates may not answer more than *three* of the sections under Question 1, and may answer *eleven* other questions.

If you answer more than *twelve* questions, only the *twelve* answers coming first on your paper will be revised.

The solutions must be given at such length as to be intelligible to the Examiner, otherwise the answer will be considered of no value.

1. (*a*) Distinguish between concrete and abstract numbers, between notation and numeration, and explain (as to a child in Standard II.) the reason for the process of short division (*e.g.*, $5678 \div 3$).

(*b*) How would you find the G.C.M. of two numbers which can easily be resolved into simple factors (*e.g.*, 1848 and 2079)? Explain why your answer is the *greatest* common measure.

(*c*) How would you explain to a class beginning fractions the error in the following: $\frac{3}{4}+\frac{2}{7}=\frac{3+2}{4+7}=\frac{5}{11}$?

(*d*) How would you work on the blackboard and explain to a class (beginning such problems) the following sum? If 7 men can earn £9 9s. in 6 days, how much will 11 men earn in 4 days at the same rate?

(*a*) i. An *abstract* number, as 9700, is one that is considered independently of, and unattached to, anything else.

ii. A *concrete* number, as 9700 angels, is one that denotes how many of a particular thing are being considered.

iii. The teacher should proceed much as in Long Division, and according to the process illustrated by the figures to our right.

5 TH. ÷ 3 evidently gives 1 TH. as quotient and 2 TH. remainder.

But this 2 TH. remainder is 20 H., and together with 678 gives a total remainder of 26 H. 7 TNS. 8 U.

Again, 26 H. ÷ 3 gives 8 H. as quotient and 2 H. as remainder.

But this 2 H. remainder is 20 TNS., and together with 78 gives a total remainder of 27 TNS. 8 U.

Again, 27 TNS. ÷ 3 gives 9 TNS. as quotient and 0 TNS. remainder; therefore the total remainder is 8 U.

Again, 8 U. ÷ 3 gives 2 U. as quotient and 2 U. as the final remainder.

Lastly, collecting all the quotients—the—

TH. H. TNS. U.
3 | 5 6 7 8
1 TH. and 26 7 8 remainder.

H. TNS. U.
3 | 26 7 8
8 H. and 27 8 remainder.

TNS. U.
3 | 27 8
9 TNS. and 8 remainder.

U.
3 | 8
2 U. and 2 remainder.

TH. H. TNS. U.
Ans. = 1 8 9 2⅔.

(*b*) $1848 = 2 \times 2 \times 2 \times 3 \times 7 \times 11$.
$2079 = 3 \times 3 \times 3 \times 7 \times 11$.

The greatest common measure is, therefore, evidently $3 \times 7 \times 11 = 231$; for every measure of a number is a factor of that number. Now the only remaining measures of 1848 are 2, 2, 2, and the only remaining measures of 2079 are 3, 3; but as 2 is prime to 3, there is no common measure of $2 \times 2 \times 2$ and 3×3. Therefore, there is no other common measure of 1848 and 2079; so that 231 is the *greatest* C.M.

(*c*) The denominator of a fraction is the *name* of the number of things denoted by the numerator, thus, $\frac{3}{4} = 3$ fourths; and $\frac{2}{7} =$ 2 sevenths. Now concrete numbers when added together must be of the same kind; else, what would be the concrete name of their sum? If we add 3 shillings and 2 fivepences together, and call it 5 *somethings*, what is this something? It would be ridiculous to say that it is 5 one-and-fivepences; and an identical absurdity would exist in saying 3 quarters and 2 sevenths = 5 elevenths.

(*d*) The class would understand 'Rule of Three' both by 'Simple Proportion' and 'Method of Unity.'

i. Amount earned by
7 men in 6 days = £9 9s.
∴ 1 man in 1 day = £9 9s. ÷ 42.
∴ 11 men in 4 days = £9 9s. ÷ 42 × 44.
= £9 9s. ÷ 21 × 22 = 9s. 0d. × 22 =
£9 18s. Ans.

Explanation.—One man will earn only $\frac{1}{7}$ as much as 7 men, and in 1 day only $\frac{1}{6}$ as much as in 6 days, etc. Also 11 men will earn 11 times as much as 1 man, and in 4 days 4 times as much as in 1 day, etc.

ii. Break up the problem into the two following:—

(1) 'If 7 men can earn £9 9s. in 6 days, how much will 11 men earn in the same time?

As 7 men : 11 men :: £9 9s. : *x*.
Ans. $\frac{11}{7}$ × £9 9s.

(2) If $\frac{11}{7}$ of £9 9s. be earned in 6 days, how much can be earned in 4 days?

As 6 days : 4 days :: $\frac{11}{7}$ of £9 9s. : *x*.
Ans. $\frac{11}{7} \times \frac{4}{6}$ of £9 9s. = £9 18s., as before.

From this analysis the 'Double Rule of Three *statements*' and working can be drawn, and the composition of ratios illustrated, viz.—

As 7 : 11 :: £9 9s. : *x*
6 : 4

As 6 × 7 : 11 × 4 :: £9 9s : *x*

iii. 7 men doing 6 days' work each = 1 man doing 42 days' work.

11 men doing 4 days' work each = 1 man doing 44 days' work.

The problem then becomes :—

'If a man working 42 days earns £9 9s., how much will he earn in 44 days?

As 42 days : 44 days :: £9 9s. : x.

This method again illustrates all the preceding processes.

2. The area of a county is 304,629 acres, and the population 207,129; find to the nearest integer the number of persons per square mile.

304,629 acres $= \frac{304,629}{640}$ sq. miles.

$\therefore$ Pop. per sq. mile $= 207,129 \div \frac{304,629}{640} = \frac{207129 \times 640}{304629} = \frac{5311 \times 640}{7811} = \frac{2599040}{7811} = 332\frac{5788}{7811}$.

Now, as 5788 is more than half of 7811, the *nearest* integer is 333 Ans.

3. Four men can walk 105, 112, 126, and 168 miles in a week respectively; what is the least distance they can all walk in an exact number of weeks?

This is plainly the L.C.M. of 105, 112, 126, 168 miles.

$105 = 3 \times 5 \times 7$
$112 = 2 \times 2 \times 2 \times 2 \times 7$
$126 = 2 \times 3 \times 3 \times 7$
$168 = 2 \times 2 \times 2 \times 3 \times 7$

$\therefore$ L.C.M. $= 7 \times 5 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2 = 5040$.

Ans. 5040 miles.

4. Find, by Practice, the cost of 27 tons 16 cwt. 32 lbs. at £3 17s. 10½d. per cwt.

27 tons 16 cwt. 32 lbs. = 556 cwt. 32 lbs.

£ s. d.
3 17 10½ = cost of 1 cwt.
556

lbs. cwt.						
16 of 1 = ¼	2164	18	6	= cost of 556 cwt.		
16 „ 1 = ¼	0	11	1½	= „ „	0	16 lbs.
£	0	11	1½	= „ „	0	16 lbs.
	2166	0	9	= „ „	27 tons 16 cwt. 32 lbs.	

5. If 56 acres 2 roods 21 poles cost £3,899 2s., how much will 17 acres 3 roods 33 poles cost at the same rate?

acres roods poles poles
56 2 21 = 9061
17 3 33 = 2873

As 9061 : 2873 :: £3,899 2s. : x
41 : 13 :: £3,899 2s. : x
1 : 13 :: £95 2s. : x
$\therefore x =$ £95 2s. $\times$ 13 = £1,236 6s. Ans. £1,236 6s.

6. How many days will it take 75 men to excavate a canal 4 miles long, 10½ feet wide, and 9 feet deep; 37½ days having been required by 105 men to excavate a canal 1,400 yards long, 24 feet wide, and 5½ feet deep?

4 miles = 7040 yards.

days
As 75 : 105 :: 37½ : x
1400 : 7040 ::
24 : 10½ ::
5½ : 9 :: OR,

days
As $75 \times 1400 \times 48 \times 11 : 105 \times 7040 \times 21 \times 18 :: \frac{75}{2} : x$
$5 \times 35 \times 16 \times 11 : 7 \times 176 \times 7 \times 18$

Days $\frac{75 \times 7 \times 176 \times 7 \times 18}{2 \times 5 \times 35 \times 16 \times 11} = 3 \times 7 \times 9$ days $=$

189 days. Ans.

7. (*a*) Divide $2\frac{1}{4} - \frac{3}{8}$ of $1\frac{5}{6}$ by $\frac{1}{3}$ of $3\frac{1}{2} + \frac{3}{8}$, and (*b*) reduce $\frac{1771}{4147}$ to its lowest terms.

(*a*) $\left\{\frac{9}{4} - \frac{3}{8} \times \frac{12}{5}\right\} \div \left\{\frac{1}{3} \times \frac{19}{8} + \frac{3}{8}\right\} =$
$\left(\frac{9}{4} - \frac{12}{5}\right) \div \left(\frac{7}{6} + \frac{3}{8}\right) =$
$\frac{81 - 44}{36} \div \frac{16 + 35}{40} =$
$\frac{37}{36} \div \frac{51}{40} = \frac{37}{36} \times \frac{40}{51} =$ $\frac{370}{459}$. Ans.

(*b*) $\frac{1771}{4147} =$ $\frac{7}{17}$. Ans.
(Cancelling by 683.)

8. Express (*a*) $\cdot\dot{4}8\dot{1}$ and (*b*) $\cdot 7\dot{2}$ as vulgar fractions in their lowest terms, (*c*) and their difference as a circulating decimal.

(*a*) $\cdot\dot{4}8\dot{1} = \frac{481}{999} =$ $\frac{13}{27}$. Ans.

(*b*) $\cdot 7\dot{2} = \frac{72 - 7}{90} = \frac{65}{90} =$ $\frac{13}{18}$. Ans.

(*c*) $\frac{13}{18} - \frac{13}{27} = \frac{39 - 26}{54} = \frac{13}{54} =$ $\cdot 2\dot{4}0\dot{7}$. Ans.

Second Method—

$(\cdot 7\dot{2} - \cdot\dot{4}8\dot{1}) =$ ·722222222. . .
·481481481. . . .
·240740741.

$\therefore$ Answer = $\cdot 2\dot{4}0\dot{7}$ as before.

9. Divide (*a*) ·02156 by ·0022, and (*b*) find the square root of $154751\frac{77}{169}$.

(*a*) $\cdot 02156 \div \cdot 0022 = \cdot 00196 \div \cdot 0002 = \cdot 00098 \div \cdot 0001 = \cdot 00098 \div \cdot 00010 = 98 \div 10 =$ 9·8. Ans.

(*b*) $\sqrt{154751\frac{77}{169}} = \sqrt{\frac{2615296}{169}} = \sqrt{\frac{2615296}{13}} = \frac{\cdot 5114}{13} =$ $39\frac{\cdot 3}{13}$. Ans.

* 26|15|29|96(5114
25
—
115
101 101
—
1429
1021 1021
—
40896
10224 40896
—
.....

10. Three men, A, B, and C, together fill a pit in two hours and a half, throwing in respectively 6, 8, and 9 equal shovelfuls of earth per minute. In what time could each man have filled up the pit by himself?

2½ hours = 150 minutes
A throws in $150 \times 6 = 900$ shovelfuls
B „ „ $150 \times 8 = 1200$ „
C „ „ $150 \times 9 = 1350$ „
$\therefore$ No. of shovelfuls in pit = 3450 „

Time required by A to fill the pit $= \frac{3450}{6}$ mins. = 575 mins. = 9 hrs. 35 mins. Ans.

Time required by B to fill the pit $= \frac{3450}{8}$ mins. $= 431\frac{1}{4}$ mins. = 7 hrs. 11¼ mins. Ans.

Time required by C to fill the pit $= \frac{3450}{9}$ mins. $= 383\frac{1}{3}$ mins. = 6 hrs. 23⅓ mins. Ans.

Second Method.

A does $\frac{6}{6+8+9} = \frac{6}{23}$ of the work.

$\therefore$ Time required by A $= \frac{23}{6}$ of 150 minutes $= \frac{3450}{6}$ minutes, etc., as before.

11. A person has equal sums invested in three undertakings which yield respectively 3 per cent., 4 per cent., and 5 per cent., and his total income is £240. What is his capital?

As the sums invested are equal, 4 per cent. is the average yield.
$\therefore$ Sum required to produce £4 = £100
„ „ „ „ £240 = £6,000.
$\therefore$ In each of the three undertakings, £2,000 is invested.

12. Knives are bought at 11 for 10s. and sold at 10 for 11s. What is the gain per cent.?

Cost of 11 knives = 10s.
„ „ 110 knives = 100s.
Selling price of 10 knives = 11s.
„ „ „ 110 „ = 121s.
$\therefore$ Gain on 100s. = 21s., OR, 21 per cent. Ans.

13. In what time will £385 4s. 2d. amount to £471 17s. 7½d. at 5 per cent. per annum simple interest?

Amount = £471 17s. 7½d.
Principal = £385 4s. 2d.
$\therefore$ Interest = £86 13s. 5½d.

The question now becomes '*If it take £100 one year to earn £5, how long will it take £385 4s. 2d. to earn £86 13s. 5½d.?*'

As £385 4s. 2d. : £100 :: 1 year : x
£5 : £86 13s. 5½d. :: 1 year : x
Now £385 4s. 2d. = 369800 farthings, and
£86 13s. 5½d. = 83205 farthings.
∴ As 5 : 100 :: 1 year : x
369800 : 83205 :: 1 year : x

$\frac{100 \times 83205}{5 \times 369800}$ years $= \frac{16641}{3698}$ years $\frac{9}{2}$ years $= 4\frac{1}{2}$ years. Ans.

14. (*a*) A man buys railway debenture shares, paying 4½ per cent., and he buys at such a price that he gets 3½ per cent. on his money. At what price does he buy? (*b*) What sum must be invested in 2¾ per cent. consols at 96½, in order to derive an income of £166 13s. 4d.? (Neglect brokerage.)

(*a*) The ratio of the actual to the nominal percentage is inverse to the ratio of the actual price to the nominal price.

We will assume the nominal price of the shares to be £100

Then actual to nominal percentage $= \frac{3\frac{1}{2}}{4\frac{1}{2}} = \frac{20}{27}$

∴ Actual price is $\frac{27}{20}$ of nominal price $= \frac{27}{20}$ of £100 =

£135. Ans.

(*b*) Amount invested to obtain $£\frac{11}{4} = £\frac{385}{4}$

" " £11 = £385

" " £1 $= £\frac{385}{11} =$ £35

∴ " " £166⅔ $=$ £35 $\times \frac{500}{3} = £\frac{17500}{3} =$

£5833 6s. 8d. Ans.

Latin.

MEN CANDIDATES.

Friday, July 8th, 4 to 6.

1. Translate into English :—

(*a*) Helvetii, omnium rerum inopiâ adducti, legatos de deditione ad eum miserunt: qui cum eum in itinere convenissent, seque ad pedes projecissent, suppliciterque locuti, flentes pacem petissent, atque eos in eo loco, quo tum essent, suum adventum exspectare jussisset, paruerunt.

(*b*) Hac oratione habitâ, mirum in modum conversæ sunt omnium mentes; summaque alacritas et cupiditas belli gerendi innata est: princepsque decima legio, per tribunos militum, ei gratias egit, quod de se optimum judicium fecisset; seque esse ad bellum gerendum paratissimam confirmavit.

(*a*) The Helvetii, compelled by want of everything, sent envoys to him to surrender. And these, meeting him on the way, cast themselves at his feet, and speaking as suppliants, asked for peace; and he, ordering them to await his arrival in the same place, where they then were, was obeyed.

(*b*) When this speech had been delivered, the minds of all were changed in wonderous wise, and the greatest alacrity and ardent desire for waging war is engendered; and the tenth legion especially thanked him, through their military tribunes, for having expressed the most favorable opinion of them, and asserted that they were quite prepared for a compaign.

2. Parse these words: 'inopiâ,' 'convenissent,' 'pacem,' 'eos,' 'conversæ,' 'judicium,' 'confirmavit.'

'inopiâ,' Subs., 1st decl. (inopia, -æ), fem. gen., sing. num., abl. case; of the instrument.

'convenissent,' Verb trans. 4th conj. (conven-io, -ire, -i, -tum), act. verb, subj. md. (gov. by 'cum, in narration), 3rd per., plur. num., plupf. tense, agrees with subj. expressed in ending '-ent,' gov. 'eum.'

'pacem,' Subs., 3rd decl. (pax, pacis), fem., sing. num., acc. case, object of 'petissent.'

'eos,' Demons. adj. (is, ea, id), plur., masc., acc. case, subj. to inf. exspectare, depends on 'jussisset.'

'conversæ,' Verb. trans., 3rd conj. (converto, -ere, -rsi, -sum, pass. verb, ind. md., 3rd plur., perf. (with 'sunt'), agrees with subj. 'mentes.'

'judicium,' Subs., 2nd decl. (judicium -i), neut. gen., sing., acc. case, direct obj. of fecisset.

'confirmavit.' Verb trans., 1st conj., regular, act. verb, ind. md., perf., 3rd per. sing., agrees with subj. legio; govs. 'se.'

3. Give the future, the perfect, and the imperfect tenses (indicative mood) of the following verbs: 'esse,' 'confirmare,' 'mittere,' 'gerere.'

Tense	Pers.	esse	confirmare	mittere	gerere
Fut. S.	1.	ero	confirmabo	mittam	geram
	2.	eris	confirmabis	mittes	geres
	3.	erit	confirmabit	mittet	geret
Fut. P.	1.	erimus	confirmabimus	mittemus	geremus
	2.	eritis	confirmabitis	mittetis	geretis
	3.	erunt	confirmabunt	mittent	gerent
Perf. S.	1.	fui	confirmavi	misi	gessi
	2.	fuisti	confirmavisti *v.* confirmasti	misisti	gessisti
	3.	fuit	confirmavit	misit	gessit
Perf. P.	1.	fuimas	confirmavimus	misimus	gessimus
	2.	fuistis	confirmastis *v.* confirmavistis	misistis	gessitis
	3.	fuerunt *v.* fuere	confirmaverunt *v.* confirmavere	miserunt *v.* misere	gesserunt *v.* gessere
Impt. S.	1.	eram	confirmabam	mittebam	gerebam
	2.	eras	confirmabas	mittebas	gerebas
	3.	erat	confirmabat	mittebat	gerebat
Impt. P.	1.	eramus	confirmabamus	mittebamus	gerebamus
	2.	eratis	confirmabatis	mittebatis	gerebatis
	3.	erant	confirmabant	mittebant	gerebant

4. Select from the passages in Question 1 any examples (1) of the subjunctive mood; (2) of the ablative absolute; (3) of a preposition governing an ablative.

(1) convenissent Subj. governed by cum., introducing a narrative.
projecissent Subj. governed by cum., introducing a narrative.
petissent Subj. governed by cum., introducing a narrative.
essent Subj., verb of a relative sentence in oratio obliqua.
jussisset Same as 'convenissent,' etc.
fecisset Subj., gov. by 'cum' causal.

(2) hâc oratione habitâ = quum hanc orationem habuisset.

(3) 'de' govs. 'deditione,' 'in' govs. 'itinere,' 'in' govs. 'eo loco,' 'de' govs. 'se.'

5. Give the Latin equivalents for the following English sentences :—

He began to follow them.
Cæsar replied in these words.
They made the journey in about fifteen days.

Coepit eos sequi.
Haec dicta Cæsar respondit, or Talia Cæsar respondit.
Minimum abfuit quin conficerent iter quindecim dies.

6. Decline the words 'qui,' 'virtus,' 'noster,' 'navis,' 'copia.'

		Masc.	Fem.	Neut.
S.	N.V.	qui	quæ	quod
	Acc.	quem	quam	quod
	G.	cujus		
	D.	cui		
	Abl.	quo	quâ	quo
P.	N.V.	qui	quæ	quæ
	Acc.	quos	quas	quæ
	G.	quorum	quarum	quorum
	D. and Abl.	quibus or quis		

			Masc.	Fem.	Neut.
S.	N.V.	virtus	noster	nostra	nostrum
	Acc.	virtutem	nostrum	nostram	nostrum
	G.	virtutis	nostri	nostræ	nostri
	D.	virtuti	nostro	nostræ	nostro
	Abl.	virtute	nostro	nostrâ	nostro
P.	N.V.	virtutes	nostri	nostræ	nostra
	Acc.	virtutes	nostros	nostras	nostra
	G.	(virtutum)	nostrorum	nostrarum	nostrorum
	D. & A.	virtutibus	nostris		

S.	N.V.	navis	copia
	Acc.	navem or -im	copiam
	G.	navis	copiæ
	D.	navi	copiæ
	Abl.	nave	copiâ
P.	N.V.	naves	copiæ
	Acc.	naves or -is	copias
	G.	navium	copiarum
	D. & A.	navibus	copiis

7. Summarise briefly the contents of the first book of Cæsar's Commentaries.

The first chapter gives a description of Gaul and the Gauls. The Helvetii emigrate. Orgetorix dies suddenly. They are opposed by Cæsar, who cuts the Tigurini to pieces on the Arar; Dumnorix shows treachery, and is pardoned. The Romans fail, under Considius, but defeat the Helvetii at Bibracte. They return to their country, but the Boians are allowed to settle among the Ædui. The Gauls complain of Ariovistus, and Cæsar answers them, and seeks a conference with Ariovistus, which is refused. He marches upon Ariovistus, and seizes Vesontio. They agree to a conference, and Ariovistus uses treachery, but tries to come to terms. Cæsar makes two camps, the second of which Ariovistus attacks and is defeated. He escapes across the Rhine in a little skiff. Cæsar then returns to Hither Gaul. (These events take place in B.C. 58.)

Euclid, Algebra, and Mensuration.

MEN CANDIDATES.

Friday, July 8th, 10 to 1.

(Marks are given for portions of Questions.)

EUCLID.

All generally understood abbreviations for WORDS may be used but symbols of OPERATION (such as —, +, ×) are not admissible.

Capital letters, not numbers, must be used in the diagrams.

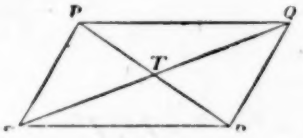
1. (*a*) If two straight lines cut one another, the vertical, or opposite angles shall be equal.

(*b*) If T be the middle point of the diagonal QS of a quadrilateral PQRS whose opposite sides are equal, then P, T, R, are in a straight line.

(*a*) Euclid I. 15.

(*b*) ∵ PQ, QS, PS = respectively RS, SQ, QR.

∴ ∧ PQS = ∧ RSQ (I. 8).



And ∵ PQ, QT, ∧ PQT = respectively RS, ST, ∧ RST.

∴ Δ PQT = Δ RST; and ∧ PTQ = ∧ RTS (I. 4.)

∴ RTP is a straight line. (Converse of I. 15.) Q.E.D.

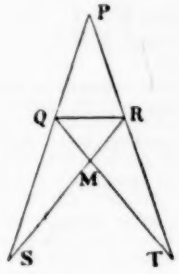
2. (*a*) If one side of a triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are equal to two right angles.

(*b*) PQ, PR the equal sides of an isosceles triangle PQR are produced to S and T so that PS, PT are equal. RS, QT intersect in M. If the angle SQT is equal to the angle PQR, then the angle SMQ is equal to twice the angle QPR.

(*a*) Euclid I. 32.

(*b*) N.B.—The diagram is the same as Euclid I. 5.

∵ ∧ SMQ = ∧s MRQ and MQR (I. 32).



And ∵ ∧ MRQ = ∧ MQR.

∴ SMQ = twice ∧ MQR, or ∧ TQR.

Again—

∧s SQT, TQR, RQP = two right angles (I. 13).

And ∧s QPR, PRQ, RQP = two right angles (I. 32).

∴ ∧s SQT, TQR, RQP = ∧s QPR, PRQ, RQP.

Take away the common angle RQP.

Then ∧s SQT, TQR = ∧s QPR, PRQ.

But ∧ SQT = PQR (Hypothesis) = PRQ (I. 5).

∴ ∧ TQR = QPR.

Again—

It has been proved that ∧ SMQ = twice ∧ TQR.

∴ ∧ SMQ = twice QPR. Q.E.D.

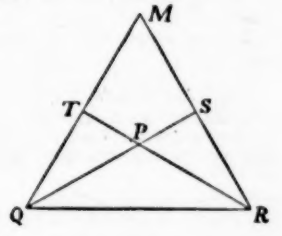
It should be noted that this enunciation is badly put; for it does not exclude the case where QP is produced *past the vertex* to S, and likewise RP to T.

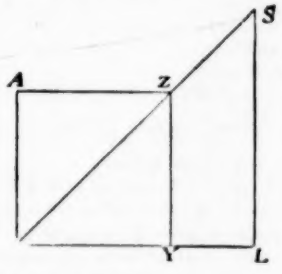
Then far from ∧ SMQ being twice ∧ QPR, it is positively less (by I. 21.).

3. (*a*) To describe a square on a given straight line.

(*b*) Find a point in the diagonal produced of a square, from which, if a line be drawn parallel to any side of the square, meeting another side produced, it will form, with the produced diagonal and produced side, a triangle equal to the given square.

(*a*) Euclid I. 46.





(*b*) Let AZYO be the given square.

Construction—

Produce OY to L, making OL = diagonal OZ.

Through L draw LS parallel to YZ, and cutting OZ produced in S.

(Or at once, produce OS so that sq. on OS = twice square on OZ.)

Then S is the point required.

Proof—

∴ Twice sq. on OY = sq. on OZ (I. 45) = sq. on OL (construction).

But sq. on OL = twice Δ OLS.

∴ Twice sq. on OY = twice Δ OLS.

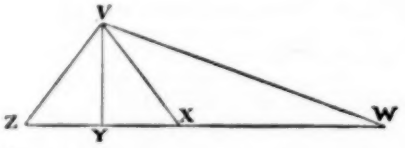
∴ Sq. on OY = Δ OLS. Q.E.F.

4. (*a*) In obtuse-angled triangles, if a perpendicular be drawn from either of the acute angles to the opposite side produced, the square on the side subtending the obtuse angle is greater than the squares on the sides containing the obtuse angle, by twice the rectangle contained by the side on which, when produced, the perpendicular falls, and the straight line intercepted without the triangle, between the perpendicular and the obtuse angle.

(*b*) If one angle of a triangle be four-thirds of a right angle, the square on the side subtending that angle is equal to the sum of the squares on the sides containing it, together with the rectangle contained by those sides.

(*a*) Euclid II. 12.

(*b*) Let VWX be the given triangle having ∧ VXW = $\frac{4}{3}$ of a right angle.



Construction—

Draw VY perp. to WX produced and meeting it in Y.

Produce WXY to Z making YZ = YX.

Join ZV.

Proof—

Δ VZY = Δ VXY (I. 4) and ∧ VZY = ∧ VXY and ∧ ZVY = ∧ XVY and ∧ ZVX = twice ∧ XVY.

Again—

∧ YXV = $\frac{2}{3}$ rt. ∧ (I. 12).

∴ ∧ XVY = $\frac{1}{3}$ rt. ∧ (I. 32) ∴ ∧ YXV = ∧ ZVX = VZX.

∴ side XV = side XZ (I. 6) = twice XY ; ∴ twice rect. WX.XY = rect. WX.XV.

Again—

sq. on VX = sq. on WX, sq. on VX and twice rect. WX.XY.

∴ sq. on VX = sq. on WX, sq. on VX, and rect. WX.XV.

Q.E.D.

ALGEBRA.

5. (*a*) Show that the lowest common multiple of any two expressions is found by dividing one of the expressions by their highest common factor, and multiplying the quotient by the other expression.

Find the highest common factor of

(*b*) $7x^4 - 10x^3 + 3x^2 - 4x + 4$ and $8x^4 - 13x^3 + 5x^2 - 3x + 3$.

(*a*) Let F be the H.C.F., and X the L.C.M. of A and B.

Then A = a F, and B = b F

∴ X = ab F

Also AB = a F × b F

= F ab F = FX

$$\therefore X = \frac{AB}{F} = \frac{A}{F} \times B \text{ or } \frac{B}{F} \times A.$$ Q.E.D.

(*b*) i. $7x^4 - 10x^3 + 3x^2 - 4x + 4 =$

$7x^4 - 14x^3 + 4x^2 + 7x^2 - 4x + 4 =$

$(7x^4 - 14x^3 + 7x^2) + 4x^2 - 8x + 4 =$

$7x^2(x^2 - 2x + 1) + (4x^2 - 8x + 4) =$

$7x^2(x^2 - 2x + 1) + 4(x^2 - 2x + 1) =$

$(7x^2 + 4x + 4)(x^2 - 2x + 1).$

ii. $8x^4 - 13x^3 + 5x^2 - 3x + 3 =$

$8x^4 - 16x^3 + 3x^2 + 8x^2 - 3x + 3 =$

$(8x^4 - 16x^3 + 8x^2) + 3x^2 - 6x^2 + 3x^2 + 3x - 6x + 3 =$

$8x^2(x^2 - 2x + 1) + 3x^2 - 6x^2 + 3x + 3x^2 - 6x + 3 =$

$8x^2(x^2 - 2x + 1) + 3x(x^2 - 2x + 1) + 3(x^2 - 2x + 1) =$

$(8x^2 + 3x + 3)(x^2 - 2x + 1).$

H.C.F = $x^2 - 2x + 1$.

(*See Scholarship Article for September.*)

6. Simplify—

$$\frac{\frac{x}{y} - 1 + \frac{y}{x}}{\frac{x}{y} + 1 + \frac{y}{x}} \times \frac{\left(\frac{x}{y}\right)^3 - 1}{1 + \left(\frac{y}{x}\right)^3} \times \frac{y^2 + xy}{x^2 - xy}$$

$$\left\{\left(\frac{x}{y} - 1 + \frac{y}{x}\right) \div \left(\frac{x}{y} + 1 + \frac{y}{x}\right)\right\} \times \left\{\left(\frac{x^3}{y^3} - 1\right) \div \left(\frac{y^3}{x^3} + 1\right) \times \frac{x+y}{x-y} \times \frac{y}{x} =\right.$$

$$\left(\frac{x^2 - xy + y^2}{xy} \times \frac{xy}{x^2 + xy + y^2}\right) \times \left(\frac{x^3 - y^3}{y^3} \div \frac{x^3 + y^3}{x^3}\right) \times \frac{x+y}{x-y} \times \frac{y}{x} =$$

$$\frac{x^2 - xy + y^2}{x^2 + xy + y^2} \times \frac{(x-y)(x^2 + xy + y^2)}{y^3} \times \frac{x^3}{(x+y)(x^2 - xy + y^2)} \times \frac{x+y}{x-y} \times \frac{y}{x} =$$

$$\frac{x^3 - xy + y^2}{x^2 - xy + y^2} \times \frac{x^2 + xy + y^2}{x^2 + xy + y^2} \times \frac{x-y}{x-y} \times \frac{y}{y^3} \times \frac{x^3}{x} \times \frac{x+y}{x+y} =$$

$\frac{x^3}{y^3}$ Ans.

7. Show that the product of any four consecutive numbers, increased by 1, is a perfect square.

Let the four consecutive numbers be

$x, x+1, x+2, x+3$

Then $\sqrt{x \times (x+1)(x+2)(x+3) + 1} =$

$\sqrt{(x^2 + x)(x^2 + 5x + 6) + 1} =$

$\sqrt{x^4 + 6x^3 + 11x^2 + 6x + 1} =$

$x^2 + 3x + 1$. Ans.

* $x^4 + 6x^3 + 11x^2 + 6x + 1 \mid x^2 + 3x + 1$

x^4

$2x^2 + 3x$ | $6x^3 + 11x^2 + 6x + 1$

$6x^3 + 9x^2$

$2x^2 + 6x + 1$ | $2x^2 + 6x + 1$

$2x^2 + 6x + 1$

.....

Second Method.

$\sqrt{x \times (x+1)(x+2)(x+3) + 1} =$

$\sqrt{x(x+3)(x+1)(x+2) + 1} =$

$\sqrt{(x^2 + 3x)(x^2 + 3x + 2) + 1} =$

$\sqrt{(x^2 + 3x + 1)(x^2 + 3x + 2) - (x^2 + 3x + 2) + 1} =$

$\sqrt{(x^2 + 3x + 1)(x^2 + 3x + 2) - (x^2 + 3x + 1)} =$

$\sqrt{(x^2 + 3x + 1)(x^2 + 3x + 1)} =$

$x^2 + 3x + 1$. Ans.

8. (*a*) If p, q be the roots of the equation $x^2 - ax + b = 0$, prove that $p + q = a$, $pq = b$.

Solve the equations

(*b*)
$$\left.\begin{aligned} 4y + \frac{65}{x} + 23 &= 0 \\ 3y - \frac{78}{5x} + 22\frac{1}{2} &= 0 \end{aligned}\right\}$$

(*c*) $\frac{2x-3}{3x-2} + \frac{2}{3} = \frac{3x-2}{2x-5}$

(*a*) $x^2 - ax + b = 0$

$x^2 - ax = -b$

$x^2 - ax + \left(\frac{a}{2}\right)^2 = \frac{a^2 - 4b}{4}$

$x - \frac{a}{2} = \pm \frac{\sqrt{a^2 - 4b}}{2}$

$x = \frac{a \pm \sqrt{a^2 - 4b}}{2}$

Let $p = \frac{a + \sqrt{a^2 - 4b}}{2}$ and $q = \frac{a - \sqrt{a^2 - 4b}}{2}$

$\therefore p + q = \frac{2a}{2} = a.$ Q.E.D.

Also $pq = \frac{a^2 - a^2 + 4b}{4} = \frac{4b}{4} = b.$ Q. E. D.

(*b*) I. $\frac{4xy + 65 + 23x}{x} = 0$; $4xy + 23x = -65$.

II. $\frac{15xy - 78x + 111x}{5x} = 0$; $15xy + 111x = 78$

[Dividing I. by II.] $\frac{4y + 23}{15y + 111} = -\frac{5}{6}$; $24y + 138 = -75y + 555$; $99y = -693$; $y = -7$.

Again, $4xy + 23x = -65$; [substituting value of y] $-28x + 23x = -65$; $-5x = -65$; $x = 13$.

$x = 13$; $y = -7$. Ans.

(*c*) $\frac{2x - 3}{3x - 2} + \frac{2}{3} = \frac{3x - 2}{2x - 5}$

$\frac{3x - 2}{2x - 5} - \frac{2x - 3}{3x - 2} = \frac{2}{3}$

$\frac{9x^2 - 12x + 4 - 4x^2 + 16x - 15}{6x^2 - 19x + 10} = \frac{2}{3}$

$\frac{5x^2 + 4x - 11}{6x^2 - 19x + 10} = \frac{2}{3}$

$15x^2 + 12x - 33 = 12x^2 - 38x + 20$

$3x^2 + 50x - 53 = 0$

$(3x + 53)(x - 1) = 0$

$x = -\frac{53}{3}$ or 1. Ans.

9. Two trains go from P to Q by different routes, one of which is 15 miles longer than the other. A train on the shorter route takes 6 hours, whilst a train on the longer route, travelling 10 miles less per hour, takes $8\frac{1}{2}$ hours. Find the length of each route.

Let x = shorter route.

Then $x + 15$ = longer route.

Then rate by shorter route $= \frac{x}{6}$

Then rate by longer route $= \frac{x + 15}{8\frac{1}{2}}$

$\therefore \frac{x}{6} = \frac{x + 15}{8\frac{1}{2}} + 10.$

$\therefore \frac{x}{6} = \frac{2x + 30 + 170}{17}$; $17x = 12x + 1200$; $5x = 1200$; $x = 240$

240 miles and 255 miles. Ans.

MENSURATION.

10. Find the acreage of a triangular field whose sides are 2170, 4040, and 4950 links.

Let s = half the sum of the sides, and a, b, and c = the sides.

Then area $= \sqrt{s(s-a)(s-b)(s-c)}$

But $s = 5580$; $s - a = 3410$; $s - b = 1540$; $s - c = 630$.

$\therefore A = \sqrt{5580 \times 3410 \times 1540 \times 630}$.

$= \sqrt{(10 \times 9 \times 2 \times 31) \times (10 \times 11 \times 31) \times (10 \times 7 \times 11 \times 2) \times (10 \times 9 \times 7)}$

$= \sqrt{100^2 \times 9^2 \times 2^2 \times 31^2 \times 11^2 \times 7^2}$

$= 100 \times 9 \times 2 \times 31 \times 11 \times 7$

$= 4296600$ sq. links $= \frac{4296600}{121000}$ acres $= \frac{3906}{11}$ acres $=$

$355\frac{1}{11}$ acres. Ans.

11. The frame of a circular mirror is $5\frac{1}{2}$ feet long, and $3\frac{1}{2}$ feet broad; find the radius of the mirror when its area is equal to that of the frame. ($\pi = 3\frac{1}{7}$).

Area of frame $= \frac{11}{2}$ feet $\times \frac{7}{2}$ feet $= \frac{77}{4}$ sq. ft.

Let r feet = radius.

Then $\pi r^2 = \frac{77}{4}$

$\therefore r^2 = \frac{77}{4\pi} = \frac{77}{4} \times \frac{7}{22} = \frac{49}{8} = \frac{49 \times 2}{8 \times 2}$

$\therefore r = \frac{7\sqrt{2}}{4}$. Ans.

LONDON MATRICULATION.

JANUARY, 1893.

OUR PREPARATION CLASS FOR PRIVATE STUDENTS.

BY T. RUSSELL MALTBY, M.A.
Kingswood School, Bath.

(SECOND MONTH.)

I. LATIN.

Notes on August Work.

Allen's Grammar, Sects. 149-153.

(1) These 'principal parts' are all that we require for the complete conjugation of a verb. Our readers should now be able to parse *any* verbal form. Try these :— *accestis, correxerit, implesses, instravit, miste, obleveris, regerit, regēre, relato, tosti.*

(2) Many forms may come from more than one verb, *e.g., crevi, cretum, fulsi, luxi, mulsi, pactum, passus. pavi, tentum, versum, victum, visum; conixi, mansi, teximus, vellet.*

(3) Candidates must exercise themselves in quantities, *e.g.* :—

cŏmēs, pres. ind. of *comedo*; I eat up.
cōmēs, comitis; a companion.
cōmēs, fut. ind. of *como* (3rd); I adorn.
cōmēs, plur. of *comis*; affable.
cŏmes, pres. subj. of *como* (1st); I clothe with hair.
cŏmas, acc. plur. of *coma*; hair.
cŏmas, pres. ind. of *como* (1st).
cōmas, pres. subj. of *como* (3rd).

(4) Copious instances were given in the PRACTICAL TEACHER for September, 1891, and April, 1892. We have not space now to do more than indicate some others; with dictionary and grammar they will be a valuable exercise :—

lăvēre, lăvĕre	*tĕgēs, tĕgĕs*
pōtis, pŏtis	*miseras, mĭseras*
dătis, dătĭs	*cecĭdit, cecīdit*
dēdēre, dēdĕre	*parcis, parcĭs*
dēdit, dĕdit	*pārens, părens*
pāvēre (2), *păvĕre*	*bibēre, bibĕre*
cāvē, căvĕ	*ēmit, ĕmit*
cāvēre, căvĕre	*prŏfectus, prōfectus*
fāvi, făvi	*fŭgēre, fŭgĕre*
cānēs, cănēs (2)	*verrēre* (2), *verrĕre* (3)
cānis, cănis (2)	*ālēs, ălēs*
cārē, cărē	*cōlo, cŏlo*
cāro, căro	*vōmēre, vŏmĕre*
ēgēre, ĕgēre	*oblīta, oblĭta*
lāte, lăte	*nōta, nŏta* (2)
nītens, nĭtens	*nōtus, nŏtus*
pătēre, pătĕre (2)	*nōvi, nŏvi*
pătĕris, pătērĭs	*rātis, rătis*
vires, vīres	*morēre, morĕre*
dūcis, dŭcis	*lābor, lăbor*

Horace, Odes III. 7 to 20 (Page). *Supplementary Notes* 7.1. *Why weepest thou for Gyges whom . . .* 2. *Primo vere: at the beginning of spring;* so *prima nocte* (29); cf. A. and H., 9, note 4. 3. *Will restore enriched with Bithynian wares.* 6. *After-the-rising-of the Goat's mad star.* 8. *Insomnis, vafer* (12), *fallax* (20): in English as adverbs. 9. *Nuntius* is subj. of *tentat, refert, narrat, movet.* 14. *Impulerit:* subjunctive of indirect question, after *ut, how*, dependent upon *refert.* 16. *To bring untimely death upon too chaste Bellerophon.* 17. *Pelea datum* (*esse*). 18. What is the masculine form of *Magnessa?* 21. *For he hears the words, deafer than the rocks of Icarus, whole-hearted still towards thee.* 22. The order is: *cave ne vicinus Enipeus placeat tibi plus iusto:* 24. *Plus iusto: more than is right;* abl. of comparison, like *scopulis.* 29. *Neque:* for *neve*, since this is a command. 31. *And remain obdurate to him though he often call thee cruel.* Distinguish two words *vĕre, fīde* and *fide*, two words *sīne, mĭseram* and *miseram*, two words *ŭri, rĕfert* and *rēfert, fŭgit* and *fugit, vŏces* and *vōces, căve* and *cāve, mănе* and *mane.*

8. 5. *Docte sermones:* for the accus. see A. and H., 35, note 1. 6. *I had vowed a dainty feast and a white goat to Bacchus, when I was all but brought to my grave by. . .* 9. *This day shall be a holiday as the year comes round and shall. . .* 13. *In honour of thy friend (thus) saved.* 21, *Servit: is our slave: Hispanae orae:* gen. with *vetus hostis.* 25. Literally: *being careless, spare as a private citizen to be too anxious;* render by three imperatives—*be careless, be a private citizen, refrain from.* Prepare short notes on all the allusions, etc., *Martiis Kalendis, Tullo, Maecenas, Cotiso, Medus, Cantaber, Scythae.*

9. 1. *Donec:* learn A. and H., 293. 2. *Quisquam iuvenis:* A. and H., 171-2; *quisquam* is sometimes used with a noun, like *ullus.* 7. *Then did I, Lydia of high renown, flourish more illustrious than Roman Ilia.* 9. *Thressa:* what is the masc. form? 10. *Modos:* see on 8.5; *citharae:* Allen 129 *(f).* 12. In Page's note for *Lydia* read *Chloe: superstiti:* proleptic, Allen 183. 13. *Fires me with mutual flame;* what is the imperative of *facio?* 17. *What if the old love is returning and joining us two now dissevered. . .* 22. *Improbo: than the ungovernable.* 24. A. and H., 257. *'Tis with thee I'd love to live, 'tis with thee I'd gladly die.*

10. 1. *Si biberes:* A. and H., 251. 2. *Yet wouldst thou weep to have me stretched before thy heartless door, and exposed to the north winds that dwell in that land.* 5. *Ianua* (*remugiat*), *quo* (*strepitu*) *nemus.* 6. *Remugiat, glaciet:* subj. of ind. question. 7. *Ventis:* abl. of cause. 11. *Difficilem: unapproachable;* cf. 7.32. 17. *Parcas:* jussive; *thou who art neither softer than hard oak.* 18. *Animum:* with *mitior*, Allen 110 (*c*). 20. *Patiens* as adj. takes gen.; as participle, accusative.

11. 1. *Mercuri:* Allen, p. 5 (note); *te magistro;* abl. abs. 3. *As thou, my lyre, skilled now to make ringing music with thy seven strings, but once neither vocal nor pleasing.* 6. *Amica et mensis et templis.* 19. *Mānet*, but *mănet* in 29. 22. *The vessel stood dry.* 27. *Fundo imo:* a loose abl. of place. 37. *Who said to her youthful husband, Rise, rise, lest lasting sleep be given to thee from whence thou fearest it not.* 46. *Because in pity I have spared my hapless husband.* 47. Look up *vel* in Dict. 50. *Secundo omine:* abl. of attendant circumstance. 51. *Nostri* = *mei*, objective genitive.

12. 1. *It is (the lot) of unhappy girls, i.e., it is the unhappy lot of girls.* 4. *From thee Cytherea's winged boy takes thy wool-basket, from thee the radiant beauty of Hebrus takes thy . . . ; and . . . .;* Cupid and the beauty of Hebrus affect Neobule in the same way. 10. *Idem, the same*, is often equivalent to an adverb, *also, likewise, at the same time, etc.; excitato:* excitato a canibus (Or.); *skilled too to shoot the stags as they fly across the open when the herd has been roused.*

13. 2. *O worthy of honeyed wine, not without flowers;* there are to be three offerings, *merum, flores, haedus.* 3. *Donaberis haedo:* A. and H., 42. note 2; turn the examples into the passive. 6. *Tibi: in thine honour.* 13. *Nobilium fontium:* partitive gen. 14. *When I tell of the ilex planted upon the hollow crags, whence leap thy babbling streams.*

14. 1. Literally: *Caesar, but lately said to have sought . . is seeking again . . .* 2. *The bay whose price is (often) death;* of course bay-leaves signified victory. 5. Wickham's paraphrase is: His wife Livia, his sister Octavia, mothers who are recovering their sons-in-law or sons, the sons themselves and their young wives, all have their parts to play. 8. *Supplice vitta:* with *decorae; adorned with suppliant wreath;* although strictly it is the fillet worn in a *supplicatio* or thanksgiving. 9. *Nuper sospitum: but lately saved from peril.* 13. *Vere* and *mihi* may be taken with *eximet* or with *festus: a real holiday for me.* 15. *Metuam* governs (1) a noun, (2) an inf. 17, *Unguentum:* note the form of this noun; it is omitted in the vocabulary. 21. *Argutae Neaerae:* dat. with *dic.* 22. *i.e.*, for a visit to my house. 23. *Invisum ianitorem:* molestus ille ianitor, qui saepe me excludit (Or.). 26. *Eager for brawls and sharp contention.* 27. *I would not have borne it;* where is the protasis? This ode should be done with special care.

15. 6. *Spargere*, like *fige*, with dir. and ind. obj. 7. *Si quid:* as comp. relative, *whatever.* 8. *More fitly does thy daughter. . .* 10. *Concita:* nom. fem. agr. with *Thyias.* 11. Note the Latin for *forces her to sport like a playful kid.*

16. 2. *And doors of oak and the surly watch of unsleeping dogs.* 3. *Munierant:* A. and H., 253. 9. *Gold is wont to make its way through the midst of attendant guards;* but *amat* means more than *solet.* 13. Distinguish *diffidit* and *diffidit.* 18. *Maiorum:* neuter; maiorum opum. 19. *Late conspicuum:* proleptically, *raise my head so as to be conspicuous far and wide.* 21. *Quanto plura . . (tanto plura):* for the ablatives of measure, see A. and H., 130. 26. *Than if I were said to hide in my granaries whatever. . .* 28. *Amid great riches unenriched* (Lonsd. and Lee). 32. *Fallit* governs *fulgentem, him who glitters;* study the note; Wickham neatly translates: *is a lot happier than his, though he cannot see it, who glitters in the lordship of fertile Africa; sorte:* abl. of respect. 39. Literally: *my desire being contracted, I shall better increase my little revenues;* in Hor. *cupido* is always masc. 43. *'Tis well for him on whom God with sparing hand hath bestowed. . .*

17. 1. *Aeli:* voc. of *Aelius; nobilis ab: nobly descended from.* 2. *Priores Lamias:* subj. of *denominatos esse.* 3. *Et genus omne nepotum denominatum esse.* 4. *Memores: recording.* 6. *Who is said to have been the first to possess.* 9. *Nemus* and *litus* are governed by *sternet.* 12. *Foreboder of rain.*

18. 1. *Faune:* here identified with the Greek *Pan*, the great god of flocks and shepherds; *Nympharum amator:* Pan loved *Echo, Syrinx, Pitnys*, and others. 3. *Lenis:* as adv.; *incedas abeasque:* jussive subj. 4. Trace out the meanings of *aequus.* 6. *And plenteous wine fails not the bowl, Venus' mate.* 9. Here begins the description of the *Faunalia*, which fell on the fifth of December. 11. *Cum otioso bove: and the ox released from toil.* 15. Wickham paraphrases thus: the ditcher revenges himself on the ground which has worked him so hard, by dancing on it.

19. 1. The distance of time between Inachus, first king of the Argives, and Codrus, last king of Athens. 3. *Narras* governs (1) a clause, (2) a noun. 7. Literally, *who providing a house, and at what hour, am I to be delivered from . . .* 12. *Commodis:* agrees with *cyathis*, but is adverbial in sense, *according to taste.* 15. *Forbids to touch more than three.* 16. *Gratia iuncta sororibus* = tres Gratiae iunctae (Or.). 19. *Why stay the blasts of . . :* look up *cesso* in Dict.

20. 1. *Non* = nonne: *moveas:* subj. of ind. question; *quanto periculo;* abl. of attendant circumstance, *at what risk.* 11. *The umpire of the fight, they say, has placed the palm beneath his naked foot, and fans with the gentle breeze. . .*

Latin Course for September.

1. *Allen's Grammar, Sects. 154-163* (Rules for Gender, Notes on Declension of Nouns and Adjectives). It is best to learn the rhymes. They also afford material for practice in declension after the special rules of Sect. 158 have been learnt.

2. *Allcroft and Haydon, Sects. 135-193.*

3. *Allcroft and Haydon, Exercises VI., VII., VIII., IX.*, A's and B's only.

4. *Horace, Odes III. Carmina XXI.-XXX.* Make a written translation.

5. *Translation at Sight. Hardy's Reader, Nos. 31, 34, 37, 43, 48, 49, 52, 55.* Written work. See under *Greek* in August PRACTICAL TEACHER.

II. GREEK.

Notes on August work.

Heracleidae, 232-460 (Jerram). *Supplementary Notes.* 232. *I pity these for their misfortune;* συμφορᾶς is gen. of cause; so in 447. 233. τῆς τύχης: almost a gen. of comparison; cf. note. 234. εἰσείδον: also a momentary aorist. 235. Decline γεγῶτες. 236. συμφορᾶς here has its 'colourless' meaning; cf. 126. 237. τοὺς σούς: in your care; parse παρώσασθαι and the following forms:—παρήσω, μεθῶ, ἐδέξω, ἀρῶ(ἀ), ἐφῆκε, εἶσομαι, πείσομαι, ἄψει, σωθήτω, εὐκτόν. 238. τὸ μὲν μέγιστον: adverbial; ἐφ' οἷ βώμοι: the first part of the note seems unintelligible; adopt the second, *i.e.* take the expression as equivalent to οὗ ἐπ' ἀγάλματι βώμιοι; cf. 113. 240. καλῶς πράσσειν: intransitive, hence the passive in note. 241. πατρῴαν χάριν: *for the sake of their father,* = πατρὸς χάριν; see lexicon for χάρις. 242. *And (thirdly) the disgrace (compels) me;* οὕνερ: gen. governed by φροντίσαι. 244. *By a stranger;* note the use of πρός. 246. *And that were nigh as bad as hanging,* lit. *near hanging.* 248. μὴ πρέσγις: Synt., sect. 146. 250. Literally, *say both this and in addition to this . . .* 253. *Not even if it should be just and I should prevail in arguing the case?* 257. *But do thou put them outside the boundaries, and then I will take them thence.* 258. *In thinking thyself wiser than the god.* 259. τοῖς κακοῖσι: dat. of the agent, Synt., sect. 113. 262. τῶν ἐνθάδε: *over the affairs of this country.* 264. Gen. absolute. 265. *That thou shouldst have a war with.* 268. Distinguish ἄρα and ἆρα below. 269. *We'll try and see about that presently.* 273. ἄπελθε: to Copreus. 276. μένουσιν: *await me (there);* distinguish μυρίοι and μύριοι. 278. *On the farthest borders of Alcathous, watching for the news from hence;* τἀνθένδε: crasis for τὰ ἐνθένδε: so προὐφείλειν, 240, (προοφείλειν), κᾆτ', 257, (καὶ εἶτα), ἠγένει, 302, (ἡ εὐγένεια), χἠμεῖς (καὶ ἡμεῖς). 280. *In brightness will he appear.* 282. ὧδέ γε: *after this treatment,* study τιμωρέω in lexicon. 285. *Thou wast not going to shame me by taking . . .* 288. πρίν: Synt., sect. 174. 290. *Ares the god of . . .* 291. *Even more than formerly;* δεύς understood. 293. Lit., *to pile up (statements) twice as great as the facts:* the gen. of comparison is used with adjectives signifying *double of, etc.* 295. *How that he was treated dreadfully and . . .* 297. Note the accent of ἔστι. 306. γῆς: partitive gen. with μόνοι; τῶνδε gov. by προέστησαν (intransitive). 315. *Worthy are they for you to reverence who . . .* 320. *And I both while I live (will exalt thee) and after death, when I stand near Theseus, will exalt thee with words of much praise, and make him glad by telling this story, how . . .* 326. τυγχάνεις, see lexicon. 328. μή: Synt., sect. 115. 329. Compare ποτέ in line 1. 332. ἥδε γαῖα is subj. of ἥνεγκε. 333. *That the conduct of these* (the Heracleidae) *will be such as you describe; our kindness will be remembered.* 337. πρῶτα: adv. 338: λάθῃ: Synt., sect. 108. 339. Ἄργει: *in Argos;* so in 360. 341. χώρει: imperative. 342. *For there are those who, even if I be away from home, will have care of thee.* 344. The optative with ἄν is often equivalent to a mild future; so in 395. 345. *Abiding here in supplication that the city may succeed.* 347. *And we have gods as allies not inferior to . . .* 350. *And I assert that this also maketh for success, to have . . .;* τοῦθ' is for τοῦτο. 352. Synt., sect. 107. 360. *But thou art foolish and . . .* 364. *Wanderers when supplicating and clinging. . .* 379. See ἔχω in lexicon. 381. μοι: ethic, as in 378. 382. Why is πέρι accented thus? 385. *Fortunate in his former undertakings, will come . . .* 395. *As a mere conjecture I would tell thee this:* a parenthesis. 396. *By what road to bring his army here without a fight and encamp . . .* 398. *But all my plans also . . .* 404. *I examined the ancient oracles, both those that are accessible to all, and those that are kept secret, all predicting safety for the city.* 406. Read the note, and then translate as though the Greek were τῶν μὲν πάντων; *and in them all there are many points that differ, but one sentiment is conspicuous as being the same.* 412. ἀναγκάσω ἄκοντα: κτείνειν. 416. τῶν μέν . . . τῶν δέ: *some . . . others,* both gen. absolute. 424. δράω is often opposed to πάσχω, see lexicon. 425. προθέμων οὐσαν: *so eager as it is.* 430. Parse ἠλάθησαν. 438. *My gratitude to thee at least assuredly is not lost.* 440. Literally, *which of the gods is unwreathed?* 443. μέλει: the note means that the person who cares is generally expressed by a dative, the thing cared for by a genitive; hence the sense is not *I care not,* but *it matters not about me.* 455. ἔτω: *let it go.* 456. λαβών: *to get possession of me and . . .* 457. καθυβρίσαι: what is the force of κατά? 458. *The wise must pray that they may have enmity with a wise man, not a man of unfeeling pride. For then one would meet with much consideration.*

Greek Course for September.

1. *Abbott and Mansfield, Sects. 112-128.* (Formation of Tenses, Contracted Verbs, Augment, Reduplication), *and 147-154* (Verbs in -μι).

2. *Abbott and Mansfield, Syntax, Sects. 33-65.*

3. *Heracleidae, 461-645.* Make a written translation.

4. *Translation at sight. Colson, Part II., No. VI., and Part III., Nos. I., II., IV., V.* See August PRACTICAL TEACHER.

II. FRENCH.

Course for September.

1. *Breymann's Grammar, Chapter I.* (Verbs). Make sure of the following:—Pres. subj. and imp. of *avoir,* future of *cueillir,* presents of *aller,* pret. def. of *coudre,* presents of *dire, prendre* throughout, presents of *vaincre, acquérir* and *faire, croire* and *croître* throughout, presents of *mouvoir* and *pouvoir.* Almost all the footnotes are important, and the paragraphs on *peculiarities of the weak verbs, interrogative and negative forms, conjugation with avoir and être* must be completely mastered.

2. *Anecdotes Historiques et Littéraires* (with Notes by V. KASTNER, M.A. Hachette). *Livre Premier, Nos. 65, 73; Livre Second, Nos. 9, 15, 18, 31.* Written translations. These should be very carefully done.

3. *Anecdotes Historiques et Littéraires. Livre Premier, Nos. 57, 60, 71; Livre Second, Nos. 22, 23, 26, 28, 29, 37, 41.* These should be translated more rapidly, notes only being taken of words not known.

4. *Word Lists.* An extensive vocabulary is absolutely necessary. Candidates should therefore compile, from the above reading and other sources, lists of French words with their meanings, and by periodical revision of these add, every week, scores of words to their permanent stock.

III. ENGLISH.

Notes on August Work.

Mason and *Hewitt and Beach* (Alphabet, Accent, Noun Adjective, Pronoun).

(1) The letter *thorn* was identified in the 15th century with the form of *y;* hence the spellings *ye* and *yt,* which of course were always pronounced *the* and *that.*

(2) Learn the list of vowel-sounds in order (as in H. and B.), and of consonants in tabular form.

(3) Observe Mason's note on 'natural' and 'grammatical' gender. The O.E. masculine noun *wif-mann* is an instance of the latter, and O.E. masculine noun *mann* of the former.

(4) Most nouns ending in *-th* take a sharp *s* in the plural (*deaths, births,* etc.); but a few have both the flat and the sharp pronunciation of *s* (*truths, laths*).

(5) The rule for the plural of nouns in *f* must be very carefully worked out. Note the plural *beliefs. Staves* was originally the plural of *staff,* but acquired a new singular *stave,* whilst *staff* acquired a new plural *staffs,* as in *army staffs.* In *calves-foot* we have the old genitive.

(6) Sweet calls the plurals formed by vowel-change *mutation-plurals,* and uses the term *mutation* for *umlaut.*

(7) Plurals of foreign words: Note the forms *crocuses, censuses; minutiæ, magi,* and others are not used in the singular. Note *stratum, strata,* and then a new plural, *stratas;* so *animalculæ.*

(8) Of the 'apparent plurals,' *riches, alms, eaves, summons,* only the last is commonly used as a singular.

(9) 'Chambers' Cyclopedia' is allowed in writing, but the pronunciation is 'Chambers's.' The *s* is only dropped in pronunciation where there would be a collocation of three sibilant sounds.

(10) Comparison of adjectives: Note specially the history of the superlative ending *-ermost.*

(11) The adjectives of two syllables, which are compared by means of *more* and *most,* are those in *-ful, -ed, -ing.*

(12) *Pronouns* require much hard work. The following points are difficult:—The classification, the history of *these* and *those,* history of the relative *that,* process by which interrogatives became relatives, history of *self.*

(13) Think out the difference between substantive pronouns and adjective pronouns. The fact that a pronoun may be used without a noun is not a sufficient reason for calling it substantival. *Mine* and *thine*, for instance, are never substantival, because they may always be regarded as *qualifying a substantive understood.*

(14) The distinction between *myself, thyself, ourselves, yourselves* (substantive), and *himself, herself, itself, themselves* is one of history, not of usage. In the former *self* is obviously a substantive qualified by *my, thy, our, your;* in the latter it is an adjective qualifying the substantives *him, her, it, them.*

(15) These pronouns have another use which is not reflective at all, viz., the *emphatic* use, as *I did it myself.*

(16) Query: To analyse: (*a*) England expects every man to do his duty; (*b*) The boatmen hear her call the cattle home; (*c*) I believe him capable of any villainy; (*d*) I'll have thy beauty scratched with briars.

(*a*) 1. England - - *subj.*
2. expects - - *pred.* (*complete*).
3. every man to do his duty } *object* (*complex*).

Here the object consists of a substantive and an infinitive phrase as indirect predicate.

(*b*) Contains a complex object of the same sort, viz., a substantative *her*, and an infinitive phrase (*call the cattle home*) as ind. pred.

(*c*) 1. I *subj.*
2. believe *pred.* (*complete*).
3. him (to be) capable } *object* (*complex*), as above.

(*d*) 1. I *subj.*
2. will *pred.* (*incomplete*).
3. have *infinitive complement of* 2.
4. thy beauty scratched } *object* (*complex*).

Here the object consists of a substantive and a participial phrase as indirect predicate.

English Course for September.

1. *Mason. Verbs and Adverbs.* When this is well known, turn to

2. *Hewitt and Beach, pp. 108-211.* Answer the questions, and supplement Mason.

3. *Ransome's History, 1399 to 1603, with the Geography relating thereto.*

IV.—MATHEMATICS.

Course for September.

1. *Arithmetic.*—Pay attention to *Theory*, and work out occasional Matriculation papers.

2. *Algebra.—Hall and Knight, Chapters XV.-XVIII.*

Make sure of *Sects. 114, 115.* Cube root may be omitted. Much depends upon facility in resolving into factors. Examples XVII., *b, c, d, e, f, g, h, k, l,* should be worked right through. Aim at speed. In finding H.C. Factors, use the methods of Chapter XVII. wherever possible. Make sure of the book-work, *Sects 146-148.*

3. *Euclid.—Hall and Stevens, Book III., Props. 1 to 19, with Exercises.*

V.—MECHANICS.

Wormell (price 3s., not 4s., as stated last month), *Chapters VI.-VIII.* (The Parallelogram Law and the Lever Principle.) The significance of Chapter VI. will not appear upon the first or the second reading, but a thorough understanding of the parallelogram of forces is essential. Examples involving trigonometry or logarithms may be omitted. Work all the rest.

VI.—CHEMISTRY.

Kemshead, Chapters I.-VI. (Theory), *XIV., XV.* (Nitrogen). Work the examples.

VI.—HEAT AND LIGHT.

Stewart, Chapters VIII., IX., X. (Vaporisation and Condensation, Hygrometry, Transmission). Write out formal answers to the questions given.

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PUPIL TEACHERS' COURSE.

I. Considering the near approach of the October Examination, we have somewhat modified the routine and devoted two hours per week to EXAMINATION PRACTICE, as well as setting aside a longer time for History and Geography, subjects which require much laborious revision.

We would reiterate (and the importance of the remark would justify its *monthly* insertion) that Examination Practice must in no wise be neglected, but at all hazards must be afforded.

The industrious plodder will now find his reward; for instead of being absolutely compelled (as the shirker will be) to give up his time to the mere acquisition of raw knowledge, he will be able now to study the '*Art of Answering*' and will have the power to display his riper attainments to the best advantages.

'He who gives quickly gives twice,' and he who learns in time learns twice, for he has opportunity to do so.

II. The subject of 'Pupil Teachers' Year Books' has often been brought before us, and our opinion expressed upon their use. Unhesitatingly would we condemn their exclusive employment, but, for purposes of mere revision, and at the close of the school year, they may, *if judiciously used*, be of peculiar service. So great, however, has been their abuse that we almost hesitate to give this guarded recommendation.

III. This month a considerable, nay a remarkable, proportion of requests have had to meet with a negative response, solely on account of their voluminous nature and the limited time at our disposal. We mention no names, but one P.T. requested us to write out for him an account of (*a*) the new discoveries in Africa, (*b*) the changes in the map of Europe since 1815 and, after a few minor inquiries, desired to know our opinion of (*a*) 'Home Rule for Ireland,' (*b*) 'The Eight Hours Bill,' and (*c*) 'One man one vote.'

Now, dear readers, we desire, we anxiously desire, to afford all reasonable information, but:—

> Questions long make time more fleeting,
> And our hearts, though stout and brave,
> Quickly throb as if entreating,
> 'Save us from a papery grave.'

IV. GEOGRAPHICAL TIT BITS, ETC.

(*a*) The delineation of the frontier between the British and Portuguese possessions in South East Africa is making rapid progress. It has been decided to take as boundary, meridian 32° 30′ east of Greenwich for the southern portion, and meridian 33° for that part of the country further to the north.

(*b*) In view of the recent eruption of Mount Etna, the subject of volcanoes and volcanic action should be attended to.

(*c*) Pupil teachers of the Third Year should 'study-up' what little is known of the geography of Thibet, of those plateaus which border upon N. W. India and Afghanistan, and of the regions in dispute between Russia and Afghanistan, and Russia and China.

(*d*) The Behring Straits' difficulty between England and the United States has been for a time practically settled, notwithstanding that the latter country advanced most unconscionable claims, which could neither be sustained by history nor supported by international law. Nothing of the kind (especially considering this late period of the world's history) so audacious has been attempted since the Spanish and Portuguese endeavoured to make the Pacific Ocean national property.

The straits and the contained islands are the great rendezvous and breeding place for seals, and the United States wished to shut out England (and Canada) from the right of catching these creatures, and tried to establish their own exclusive ownership.

When Vancouver's Island was granted in 1849 to the Hudson's Bay Company for the purpose of colonisation, the whole of the North American Pacific seaboard pertained to the hunting grounds of the Company.

However, in 1867, the Russians sold the territory of Alaska and all the islands as far south as 54° N. latitude, to the United States for a sum equal to £700,000.

Then this latter country let out the islands for seal-catching, but as (1) the islands had been more utilised by England than Russia, and (2) no fixed line of demarcation had been agreed upon, our Government refused to allow our commerce and enterprise to be limited by the transaction.

Many of the Americans, including their best jurists, considered their claim untenable, and, indeed, there is a strong suspicion that it was unduly urged upon us for merely electioneering purposes.

Our statesmen, too, probably remembered the exhorbitant 'Alabama Claims,' which, though enormously reduced, resulted in us handing over so large a sum of money to the United States that even urgent solicitations failed to induce enough claimants to come forward and absorb it.

(*e*) Some time ago we inserted information about Manipur and Ghilgit, which was actually required at the next Pupil Teachers' Examination.

Similarly we give a few particulars about the Lushais or Kukis. These are a number of warlike and nomadic tribes which range an imperfectly explored and wild country stretching along the N.E. frontiers of India and extending along the southern borders of Assam. Their ordinary pursuits are hunting, raiding, and pony breeding, and each village is ruled by a hereditary military chief.

In the near past they have troubled Northern Burmah, partly because their ordinary locations were becoming untenable through the hostility of neighbouring tribes.

V. HISTORY.

(*a*) The 'Lives' of noted persons which are most likely to be asked for are

i. *First Year.*—
Caractacus, Agricola, The Venerable Bede, King Arthur, Alfred, Dunstan, Canute, Edward the Confessor, Godwin, and Harold II.

ii. *Second Year.*—
Hereward, Lanfranc, Anslem, Robert of Normandy, Becket, Strongbow, Earl of Pembroke, Prince Arthur, Stephen Langton, Simon de Montfort, Balliol, Robert Bruce, Wallace, Edward the Black Prince, Owen Glendower, Wiclif, John of Gaunt, Warwick the Kingmaker, and Joan of Arc.

iii. *Third Year.*—
Perkin Warbeck, Wolsey, Thomas Cromwell, Cranmer, Lady Jane Grey, Cardinal Pole, Mary Queen of Scots, Lord Burleigh, Drake, Raleigh, Lord Bacon, Strafford, Laud, Pym, Falkland, Hampden, Cromwell, Blake, Albemarle, Prince Rupert, Montrose, Clarendon, Shaftesbury, Russell, Sydney, Monmouth, Jeffreys, and Argyle.

Something should also be known of those persons, such as prominent insurgents, who were famous for one transaction only.

(*b*) The attention of 'First and Second Years' is also specially directed to the crowd of events that occurred in the last century of the Saxon era. We know from painful experience that very few people realise that the Danish Canute was king of England only 31 years before, and that the Saxon line was only restored 24 years before Hastings.

The phenomena of one battle deciding the fate of England, the easy reception of William as lawful king, the stubborn local resistances subsequently offered, the appeal of the early Norman kings to their Saxon subjects against their Norman barons, can only be appreciated and understood by those who see that the heterogeneous mass of Saxons and Danes, although impotent when uncontrolled, were yet very powerful when welded together by the heat and under the hammer of foreign oppression.

(*c*) Third Year Pupil Teachers should particularly investigate the constitutional and ecclesiastical movements of the period, specially noting how the influence of Spain affected the religious attitude of the country, and postponed those political and theological dissensions which broke out in the reign of Charles I. with such virulence when danger from abroad was no longer to be feared.

V. *School Management* we are informed on all sides is one of the subjects, if not *the* one, which shows great feebleness. Nor perhaps is this greatly to be wondered at. Let us examine (*a*) the subject itself, (*b*) the learners of that subject, and (*c*) the teachers and conditions of instruction.

(*a*) *School Management* is difficult in itself; it is a combination of theory and practice; it deals with the most fickle material; it is concerned with most diverse and varying circumstances; and is to a certain extent conventional.

(*b*) *The Learners* are (they will pardon the observation) necessarily immature in mind, limited in experience, repelled by dry-as-dust treatises, inefficiently instructed, and oftentimes overworked.

(*c*) *The Teachers* are chained to certain methods, are censured for innovations and experiments, are fatigued by a weak staff or perchance extraneous duties, are bound down by the rules of the code, the instructions to inspectors, the vagaries of examiners, the regulations or wishes of the managers, the desires of parents, and are chilled by a thousand inappreciations, neglects, slights and even insults that patient merit of the unworthy takes.

Is this picture overdrawn? We trow not. What then remains to be done?

Enough cannot be done; but sufficient has been

PUPIL TEACHERS' ROUTINE FOR SEPTEMBER, 1892.

DAYS	YEARS	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
		1st Lesson	2nd Lesson	3rd Lesson	1st Lesson	2nd Lesson	3rd Lesson	1st Lesson	2nd Lesson	3rd Lesson	1st Lesson	2nd Lesson	3rd Lesson
Monday	1	Analysis and Parsing	Revise Dates	Maps of Wales and Scotland	Composition *or* Paraphrasing	How to teach Writing	Geography of Scotland	Analysis and Parsing	How to teach Arithmetic	Maps of England and Ireland	Composition *or* Paraphrasing	Revise Dates	Geography of Australia
	2			Maps of France and Italy			Latitude and Longitude			Map of Spain Map of Coast from Gibraltar to Venice			Geography of Europe
	3			Map of India		Notes of an Arithmetic Lesson	Geography of Asia or Africa		Notes of a Lesson on Form	Map of Mediterranean Sea			Geography of Africa
Tuesday	1	Euclid Definitions, etc. Paper Patterns	Abstract Vulgar Fractions. Practice	Lives of Great Historic Persons	Euclid I. 1 to 4 Paper Patterns	Vulgar Fractions of Money Bills of Parcels	Lives of Great Historic Persons	Euclid I. 5 to 9 Practise Stitches	Vul. Fractions of Weights and Meas. Add. of Vul. Fracs	Scripture *or* Revision	Euclid I. 10 to 13 Practise Stitches	Brackets in Algebra. Any Geography	Scripture *or* Revision
	2	Euclid I. 1 to 7. Paper Patterns	Simple Proportion Money. Vulgar Fractions		Euclid I. 8 to 15 Flannel Patch	Stocks. Vulgar Fractions of Weights		Euclid I. 16 to 21 Practise Stitches	Percentages. Reductions of Vulgar Fractions		Euclid I. 22 to 26 Practise Stitches	Algebraic Factors. Any Geography	
	3	Euclid I. 1 to 15. Paper Patterns	Comp. Proportion Any Vulgar Fractions		Euclid I. 16 to 26 Practice Stitches	Equation of Payments. Decimals of Money		Euclid I. 27 to 38 Any Needlework	Discount Decimals of Measures		Euclid I. 39 to 48 Any Needlework	Simple Equations. Any Geography	
Wednesday	1	Histor. from 55 B.C. to 410	Composition *or* Paraphrasing	Scripture *or* Revision	History from 410 to 871 A.D.	English from Text Book	Scripture *or* Revision	History from 871 to 1016 A.D.	Prefixes, Roots *or* Affixes	Revise Geography	History from 1016 to 1066 A.D.	English from Text Book	Revise Geography
	2	History from 1066 to 1135 A.D.			History from 1135 to 1215 A.D.			History from 1307 to 1376 A.D.			History from 1422 to 1485 A.D.		
	3	History from 1485 to 1547 A.D.			History from 1547 to 1588 A.D.			History from 1628 to 1649 A.D.			History from 1666 to 1688 A.D.		
Thursday	1	Geography of England	Addition of Algebra. Any Arithmetic	Literature, Repetition, and Writing	Geography of Ireland	Subtraction of Algebra. Any Dates	Dates	Geography of British North America	Multiplication of Algebra. Any Grammar	Dates	Physical Geog. of Mountains and Rivers	Literature, Repetition, and Writing	Division of Algebra. Any Dates
	2	Geography of Europe	Addition of Algebra. Any Arithmetic		Geography of India	Subtraction of Algebra. Any Dates	History from 1215 to 1307 A.D.	Geography of India	Multiplication of Algebra. Any Grammar	History from 1376 to 1422 A.D.	Climates and Productions of our Empire		Div sion of Algebra. Any Dates
	3	Geography of Asia	Simple Equations. Any Arithmetic		Geography of Africa	G.C.M. of Algebra Any Dates	History from 1588 to 1628 A.D.	Geography of Asia	Mensuration of Triangles. Any Grammar	History from 1649 to 1666 A.D.	Winds and Ocean Currents		Mensuration of Parallelograms. Any Dates
Friday	1	Abstract Decimals Household Accounts	Test Examination (See appended Questions)		Decimal Fractions of Money. Practice	Test Examination (See appended Questions)		Dec. fractions of Weights and Meas. Subt. of Vul. Fracs.	Test Examination (See appended Questions)		Reduction of Fractions. Bills of Parcels	Test Examination (See appended Questions)	
	2	Comp. Proportion. Reduction of Vulgar Fractions			Averages. Vulgar Fractions of Measures			Stocks. Vul. Fractions of Weights and Meas.			Any Problems Simple and Compound Practice		
	3	Stocks. Simple Proportion			Square Root Depeating Decimals			Stocks. Decimals of Weights			Discount Simple Proportion		
Saturday	1	Language	Physical Geography	Drawing / Music	Language	Physical Geography	Drawing / Music	Language	Needlework *or* School Management	Drawing / Music	Language	Needlework *or* School Management	Drawing / Music
	2												
	3												

said to show to the thoughtful (and all our Readers are such) that the best foot must be advanced, the utmost watchfulness for, and utilisation of opportunities exercised, and the greatest industry exerted to become fairly proficient in School Management.

VI. *Sewing, etc.*, is certainly improving, but is yet far from perfection. We have never been an advocate for demanding fine-art needlework from Pupil Teachers, and we have never admired the banishment of Sewing-machines of metal (only those of flesh and blood) from our schools, yet every P.T. should be fairly proficient with needle, knitting-pins, and scissors, and should be well acquainted with the fundamental and requisite principles of Needlework. A short time ago we gave a copious list and a long account of the prevalent shortcomings, and these our young ladies would do well to study, and having studied, to avoid.

Is it always wise to hasten forward in the early part of the school year the completion of the demanded garments? Would not these be better executed if reserved for a somewhat later period?

VII. *Drawing.*—It should be noted that (*a*) Second Grade Model no longer counts as an extra at the Queen's Scholarship Examination; (*b*) Candidates cannot be examined in the same subjects in the same year both at a School of Art and at their own school; (*c*) Pupil Teachers will not be examined in Model Drawing on the Blackboard or in Drawing in Light and Shade during the term of their apprenticeship, and thus they cannot obtain the Elementary School Teachers' Drawing Certificate 'D'; (*d*) Pupil Teachers *can* secure the 'Second Grade Drawing Certificate.'

(*For Correspondence, see end of Certificate Article.*)

FIRST YEAR.

1. $\frac{3}{7}$ of a pole is in the mud, $\frac{4}{11}$ is in the water, and 2 ft. 11 in. in the air. How long is the pole? Ans. 8 ft. 2 ins.

2. Explain the process of dividing 987654 by 105, by means of factors. Ans. $9406\frac{24}{105}$.

3. *Boys.*—Add together $\frac{3}{4}$ of $\frac{5}{6}$ of £2 5s.; $\frac{3}{5}$ of 3 guineas; $\cdot\dot{2}\dot{7}$ of £1 18s. 6d., and $2\cdot1\dot{5}\dot{4}$ of £2 15s., and reduce the result to the decimal of 25 guineas. Ans. £8 5s. 9d.; $\cdot\overline{31571428}$.

Girls.—Make out and receipt a bill for

2 chests of tea, 110 lbs. each, at 2s. 3d. per lb.; 2 chests of tea, 101 lbs. each, at 3s. 11d. per lb.; 101 cwt. 14 lbs, of rice at 27s. 6d. per cwt.; 55 bags of coffee, each 1 cwt. 3 qrs., at 1s. 2½d. per lb.; ½ ton of sugar at 2¾d. per lb.

Ans. £867 9s. 7½d.

4. Write in large hand the word '*Hypercritically.*'
Write in small hand the words '*The zig-zag paths of dishonesty.*'

5. Analyse the following passage and parse the words in italics—

'*Yet even their* bones from insult *to protect*
Some frail memorial *still erected* nigh
With *uncouth rhymes* and shapeless sculpture *decked*
Implores the *passing* tribute of a sigh.'

6. Explain the meaning of the terminations in the appended words:—*maidenly, kittenhood, worshipful, worthlessness, landscape,* and *spinster.*

7. Give an account of any contest you may have witnessed.

8. Draw a map of the Murray or St. Lawrence.

9. Classify, giving instances, the different kind of lakes.

10. Give the population of the chief divisions of the British Isles, British North America, and Australia.

11. Describe the civil and religious institutions of the Britons.

12. For what events are the years 121, 787, 991, 1041, 1051, 1054 noted?

13. What are the tetrachords? How do they link adjacent scales?

14. In what order should the letters of the alphabet be learned, and why?

15. Decline *meridies* OR decline *of the* and *to the* in French.

SECOND YEAR.

1. I transfer £5,000 from a 3 per cent. stock at 72, to a 4 per cent. stock at 90. What do I gain per annum? Ans. £10.

2. From 10 poles take 8 poles 5 yards 2 feet 6 inches.
Ans. 5 yards 6 ins.

3. *Boys.*—Find a mean proportional between ·6 and ·024.
Ans. ·12.

Girls.—Simplify $\frac{2\frac{4}{5} - 1\frac{1}{2} + 9\frac{1}{11}}{4\frac{1}{5} - 2\frac{1}{4} + 13\frac{7}{11}}$ and reduce the answer to a decimal. Ans. $\cdot\dot{6}$.

4. As in First Year.

5. Paraphrase the following passage:—

My hair is *grey, but* not with years,
Nor grew it *white*
In a single night
As men's have grown from sudden fears:
My limbs are bowed, but not with toil,
But *rusted* with a vile repose,
For they have been a dungeon's *spoil*,
And *mine* has been the fate of those
To *whom* the goodly earth and air
Are banned and barred—forbidden *fare.*
But this *was* for my father's faith
I suffered *chains* and *courted* death.

6. Analyse the first six lines of the above excerpt and parse the italicised words.

7. Give instances of adjectives used as four other parts of speech.

8. Draw a map of Italy.

9. From which of our possessions do we obtain wine, tortoise-shell, and timber?

10. What is the longitude of a place where the sun passes the meridian three hours later than at Greenwich?

11. Describe the military and social organisation of the Normans.

12. For what events are the years 1164, 1176, 1215, 1258, and 1279 noted?

13. Write out Euclid I. 26. The bisectors of the angles of a triangle are concurrent, OR,
State the Needlework requirements for Standards VI. and VII.

14. Mention a few rules for determining the Gender of Latin Nouns, OR,
Write down the Days of the Week, the Months of the Year, and the Seasons in French.

15. What are the chief uses of Recitation?

16. Give the scale of four sharps in $\frac{9}{8}$ time; OR, the scale of four sharp removes (imperfect method) in nine-pulse measure.

THIRD YEAR.

1. Find the decimal of a shilling which differs from a penny by less than the millionth part of one shilling.
Ans. $\cdot\overline{083333}$.

2. Give in full, and explain as to a class, the two principal formulæ in Discount and Present Worth.

3. *Boys.*—Find to four places the value of $\frac{1}{\sqrt{5}+\sqrt{3}}$.
Ans. ·2520...

Girls.—A digs $\frac{5}{6}$ of a field in 11 days; and then with B's help does the rest in 4 days. How long would it take each, working alone, to dig the whole field? Ans. A, $17\frac{1}{2}$ days; B, $27\frac{1}{11}$ days.

4. As in First Year.

5. Analyse:—

Seated upon the *decaying* stump of a tree *embraced* by luxuriant ivy sticky *as birdlime*, the hunter, *undismayed* by his accident, *terrible though* it *was*, *weighed every* chance of escape. Parse the words in italics.

6. From what languages do we obtain the words:—

Sutton, ale, stone, port, castle, balm, gala, boor, buffoon, potato algebra, junk, jubilee, turban, damp?

7. Give definitions of the various kinds of sentences.

8. Draw a map of the western portion of the Mediterranean Sea.

9. What do you know of the Simoom, Harmattan, Sirocco, Khamsin, and Mistral?

10. Enumerate the twelve chief rivers of Asia, giving their source, tributaries, area of basin, etc.

11. What were the social and constitutional effects of the 'Wars of the Roses?'

12. For what events are the years 1492, 1558, 1580, 1598, and 1600 noted?

13. Write out Notes of a Lesson on Auxiliary Verbs.

14. Demonstrate Euclid I. 35. The diameters of a rhombus bisect each other at right angles; OR, Cut out the left half of a child's frock bodice.

15. Give the verbs derived from *eo;* OR, The nine most regular verbs of 3rd French Conjugation (*or*).

16. Find the square root of $a^2(4b^2 + 9c^2 + 12bc) - 8abc(2b + 3c) + 16b^2c^2$. Ans. $2ab + 3ac - 4bc$.

Give recipes for a rice pudding and mutton broth.

17. The sides of a triangle are in the proportion of the numbers 13, 14, 15; and the perimeter is 70 yards. Find the area. Ans. 3570.

What are the ordinary duties of a housemaid?

18. Write the Minor Scales of D and C; OR, Draw up a 'Modulator' giving the names of the chromatic notes.

TEACHERS' DRAWING LESSONS.

MODEL DRAWING FOR STANDARD V.

BY E. BUFFERY RIDGE,

Art Master under the London School Board.

LESSON VII.

PLACE a board on chairs before a section of the class as in Lesson VI. Let the front of the board be drawn in the same manner and marked off in four equal parts. Mark on the wall behind the board the general height of the pupils' eyes. This will be the position of the eye-level, which may be conceived to be a horizontal line running along the wall. If it can be actually shown, all the better.

With pencils upright, see what length of pencil will reach from the front edge of the board up to the eye-level on the wall. It may be greater or less than the line *a b*, probably less—say, about three-quarters—but not exactly the same for each individual.

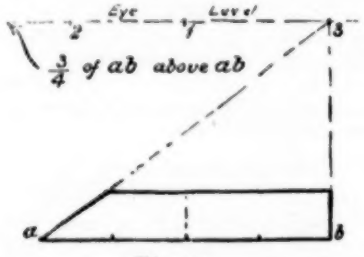

Fig. 12.

Place on the papers a horizontal line at the observed distance above *a b*. Now, let each scholar look as straight across *a b* as possible, and think how much of it is on his right hand and how much on his left. If he is opposite the middle, having half of it on either hand, let him put a mark on the eye-level line opposite—that is, exactly above the middle point of *a b* (1 in the figure). Another may be nearly in front of *a*—his mark will be at 2. A third may be just in front of *b*, mark 3, and so on. When all have made their mark, let lines be drawn from the mark to each end of *a b*. These will be the vanishing lines, which contain the ends of the board and meet together in the eye-level. Find the width of the board from front to back as in last lesson by using the pencil; and when the distance is noted, mark it above *a b*, and draw a parallel line to meet the end lines at *c* and *d*. Thicken the four edges of the board. Repeat with other sections till all have gone through the process. Vary position of board by sometimes placing one end, instead of one side, in front.

To be Learnt.—When the front edge is drawn as a horizontal line, the side edges NEVER SLANT OUTWARDS—*i.e.*, the right-hand line never slants up towards the right, nor the left hand up towards the left.

LESSON VIII.—HORIZONTAL SURFACES AT AN ANGLE.

Vertical Surfaces and Horizontal Surfaces as arranged in the foregoing lessons are not often selected for examination tests, but their consideration is important, and should be kept in the minds of the pupils by an occasional exercise, if only to enable them to avoid mixing up lines which are peculiar to such positions with other drawings. For instance, the front line of the board is a horizontal line on the paper in preceding cases, but never in any other.

Place board on chairs in front of the middle of the class as before, with front edge parallel to rows of desks. Some scholars look straight over the front edge, their line of sight being perpendicular to it. *What do the others see?* Remove those in front, or alter position of board, placing it with one corner pointing to the middle of the class, so that everyone may get an angular view. The corner of the room is generally the most convenient position for the model in

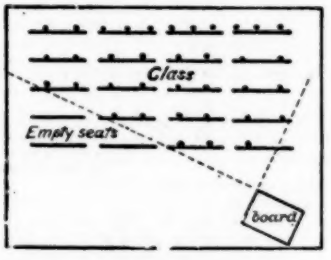

Fig. 13.

this case, but it should not always be used, or some of the children will be sure to associate in their minds the particular drawing with the position in the room of the model, and be puzzled when they get the same view but in another place. Refer to Lesson II. in which the angle at which a horizontal line appeared to slant was measured by the help of the horizontal edge of drawing paper or book. Place a book against the

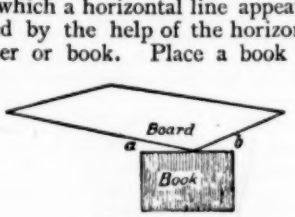

Fig. 14.

corner of the board nearest the class and point out the angular spaces at *a* and *b* seen between the board and the book. The line of the book is level, the lines of the board slant *upwards, one towards the right, the*

other towards the left. THEY ALWAYS DO. Let the class hold their books to occupy apparently the same position. (Sit facing the model, hold books by two corners with both arms straight out ; bring top edge of book to touch corner of board.) Let them decide individually :—

1st.—Are both lines slanting equally, the angles *a* and *b* being of the same size ?

2nd.—If not equal, which angle is the greater—that to the right or to the left ?

3rd.—How much are the lines inclined ?

In the case of No. 2 consider the size of the smaller angle first. Sketch on blackboard—book, dot, trial lines. Ascertain by questioning which line the pupils consider nearest in its inclination to what they see,

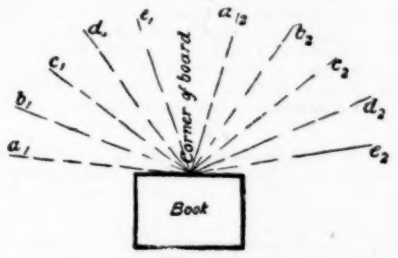

Fig. 15.

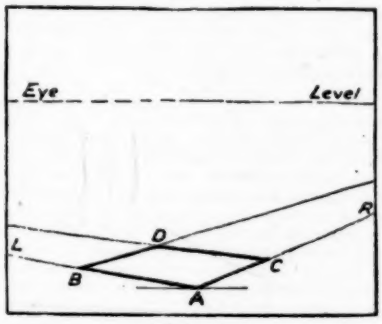

Fig. 16.

a, *b*, *c*, *d* or *e*, remembering that the general tendency is to make the angle of inclination too great. Repeat the sketch lines on the other side, letter them a_2, b_2, etc., and show that if the angles are not equal, a small angle on one side is counter-balanced by a *comparatively* large angle on the other side, so that a_1 and a_2 go together, b_1 and b_2, e_1 and e_2.

Begin sketch on board and papers by placing a horizontal line near the bottom to represent the edge of measuring paper or book, and a dot (A) in this line for the position of the corner of the model. Draw slanting line showing angle to the left. Look at it again to see if it is not slanting too much. Draw slanting line to right, equal in inclination, greater or less than on the left-hand side. Take great care with these angles—nothing is more important. Let the lines be carried to the edge of the paper. Mark B on the left-hand line, the length A B being taken at convenience, on a rather small scale at first, afterwards as large as is consistent with the size of the paper.

A B is the left-hand front of the board. Is the right-hand line equal to A B, or greater, or less ? Measure with pencils and mark C. Papers should be examined and corrected where necessary before proceeding. (Rulers for remainder of lesson.) Put in the eye-level line—measuring with pencils from B to C, and comparing length with height from A to mark on wall, and drawing horizontal line as in previous lesson. A B or A C could be used for purpose of comparison, if thought more convenient ; but the height of the level line must be in some way proportioned to the size of the model in the drawing.

A L will meet the eye-level, if produced : draw from C a line to meet A L and the eye-level in the same meeting place. Opposite sides of the board are parallel horizontal lines, which always vanish away and meet in the eye-level. Let rulers be used for this part of the work.

A R meets the level on the right—draw from B to the same place. The crossing of the two lines from B and C gives the fourth corner D of the board. Strengthen the four sides to finish the board A B C D.

Lesson IX.

Use blackboard as table, on which spread a sheet of drawing or blotting paper (oblong). The paper to be drawn, but not the board.

Proceed as in last lesson—chief points to be noted are :—

1. Two front lines slant upwards from the nearest corner, one to the right, the other to the left. How much ? Measure the angles.

2. One line any convenient length, the other in proportion.

3. Height of level line, proportionate to size of drawing.

4. Back lines run to points where front lines meet level line.

Draw these back lines without rulers first, and then correct with rulers.

The class should be cautioned against considering the edges of the board, or any other lines except those of the paper.

Compare the distance A D with B C (Fig. 17). Keep the angles down to prevent too much space from A to D.

Lesson X.

Use blackboard on which a square has been drawn in strong white lines. Draw the square.

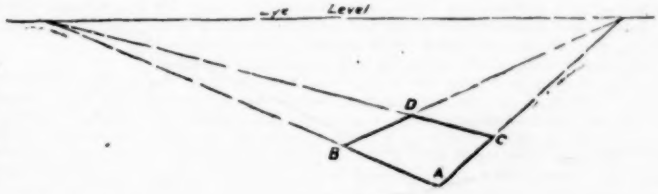

Fig. 17.

The work is the same as in the last two lessons with this addition: A B being equal to A C, it must be noted that—

1st.—The line which is inclined upwards the most is the shorter of the two. In the figure A C is shorter than A B.

2nd.—The top end of the shorter line is higher on the paper than the top end of the other line. C is higher than B.

This is always true of a square, the reason being that A C runs back farther than A B. A, the lowest corner, is nearest to the observer, B next, C next, and D farthest away.

(*To be continued.*)

SCIENCE NOTES.

THE ORIGIN OF PETROLEUM.—Professor Orton, the State Geologist, has recently been investigating the question of the origin of the extensive fields of petroleum which exist in Eastern Ohio and Pennsylvania. According to the view advanced by him, these fields were once the site of a tropical sea, upon the floor of which the shales constituting the chief source of the oil were accumulated. The rivers flowing into this sea laid down sedimentary deposits of clay and sand, with occasional gravel bars, and in the sea itself was a vast development of marine vegetation. Some of the plants had very resinous spores and spore cases, which were set free in enormous quantities, and in connection with other portions of these and similar plants were carried to the bottom in a macerated condition, there to pass through the coaly transformation, resulting in the formation of petroleum and bitumen. The petroleum was absorbed by the particles of clay in contact with it, or if formed in the water, was caught by floating particles (clay possessing the property of absorbing oils in a marked degree), and was carried by them to the floor of the sea. This process continued till the materials were exhausted; a shale much richer in petroleum than any portion of it is at the present time being thus produced. Over this was laid a bed of porous sandstone, saturated with sea-water, and roofed in by a very fine-grained shale. Then, by a slow system of exchange between sandstone and shale, the oil reached its final reservoir. The oils of Canada and Lima, which are dark and heavy, with a rank odour, Professor Orton pronounces to be of animal origin, being derived from the organic matter in limestones. This view is held, too, by Professor T. S. Hunt, who asserts that petroleum is generally of this character.

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THE TRANSPLANTATION OF SEEDLINGS.—At a recent meeting of the Botanical Society of Edinburgh, an interesting record was read of the growth of some oaks in the Forest of Dean. Of specimens reared in the same seed-bed, some were soon transplanted, others when further developed, and the rest were left undisturbed. Measurements were systematically taken from 1809 up to the present time; and comparison showed that the transplanted trees progressed so much more rapidly than the rest that transplanted oaks may reasonably be expected to reach maturity fifty years sooner than if left untouched.

***

THE ACTION OF DEW ON PLANTS.—The refreshing influence of dew on plants seems from the researches of Professor Wollny of Munich to be generally overestimated. Dew is said to refresh the thirsty plant. Now the plant thirsts if it does not receive a sufficient amount of moisture from the ground to supply the amount abstracted from it by the atmosphere. In times of drought, when the earth is parched and moisture is necessary for plant life, there is no dew. Moreover, the amount of moisture which a plant is capable of absorbing by means of its leaves is extremely small. If the leaves and buds, which during the heat of the day are parched, regain their freshness during the night, it is not owing to the refreshing influences of dew, but because the air having ceased to extract so much moisture from the plant, and the suction from the earth always continuing, a fresh supply of moisture has been laid up. The dew is only of use in providing the leaves of plants, as it were, with a covering which is some defence against the continual suction of the atmosphere; but even this seems not to be necessary, for the parched parts of the plant can become fresh without a dewy covering.

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THE CAUSES OF THE FORMATION OF DEW.—Professor Wollny opposes the prevalent view that dew is formed by condensation taking place in the atmosphere immediately over the plant, holding with Gersten that dew-drops are caused principally by the moisture arising from the earth. He states that in the field where he made observations the dew was sometimes much heavier in one place than another; and that while the difference could not be accounted for by the supposition that there was so much difference in the moisture of the atmosphere immediately over the places in question, the difference of moisture in different parts of the field accounted easily for the heavy or light deposition of dew. The quantity of dew deposited depends upon the moisture of the earth. The quantity of moisture abstracted from the soil by the plant through its roots depends not only on the moisture of the soil at that particular spot, but also on the temperature. The higher the temperature of the earth the greater is the amount of moisture abstracted by the plant. In winter, at low temperatures, the plants can extract little or no moisture, and often die in consequence. During summer nights the earth cools very slowly and loses very little of its heat. Then the plants abstract a great quantity of moisture; so much that the water sometimes oozes from the leaves, or in case the surface of the leaves is suddenly cooled, is condensed and given off in drops. Wollny concludes, therefore, that the presence of dew on plants arises from the moisture absorbed by the roots, combined with the action of the moisture rising directly from the earth itself.

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A NEW ASTRINGENT.—Pambotano, a Mexican remedy for intermittent and malarial fevers, has lately been grown in the open air at Valencia, in Spain. *Calliandra Houstoni* owes its medicinal value to the presence of a tannin of a very astringent quality, a peculiar characteristic of which is that it easily turns red when brought into contact with the air. It may be found practicable to cultivate the plant in Southern France and Algiers.

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THE POTATO DISEASE.—Mr. Carroll is of opinion that the ability of potatoes to resist disease is in the main a question of the physiological formation of the stem and leaves. The hard, dark green small hairy leaves and hard stems of some varieties resist the attack of the fungus (*Phytophthora infestans*) better than the large, light green leaves and watery stems of other varieties. Potatoes, too, whose tubers are some distance from the stem, especially if deeply buried in the ground, produce a crop freer from disease than those whose tubers cluster closely round the stem, thus supporting the theory that the disease reaches the tubers through the spores falling upon them from the leaves, rather than by the penetration of the mycelium through the stems.

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THE FERMENTATION OF BREAD.—M. Léon Boutroux has lately been endeavouring to solve the problem whether the part of leaven useful to the baker is a yeast, or a bacterium, or an association of several micro-organisms, and also whether the gas that is given off in fermentation is produced at the expense of the gluten, of the starch, or of the soluble matter in the flour. An elaborate course of experiments has led him to conclude that the alcohol-forming yeast is always present in the leaven of bread, and that it may be cultivated in successive batches of dough, multiplying itself to such an extent that, when a mere trace is taken in the first place, after successive cultures in dough, it is found to permeate every part of the mass. Whilst the experiments do not prove that any micro-organism other than yeast is incapable of raising the dough, they show that in a leaven obtained by mixing yeast, flour, and water, the first is the only agent in the fermentation properly so called. New sugar seems not to be formed in any appreciable quantity at the expense of the starch, the small quantity of sugar that is fermented consisting of what pre-existed in the flour, together with what is formed from carbo-hydrates, more readily affected than the starch. With regard to the action of the microbes found in leaven or in dough, they are not only useless but harmful, since they attack the gluten and cause acidity in the dough. Care should therefore be taken by bakers to secure as pure cultures of yeast as possible.

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THE DEFOLIATION OF THE VINE.—From time immemorial it has been the custom in the Gironde and other wine districts of France to strip off the leaves from the immediate vicinity of the bunches of grapes, with the view of promoting their ripening. A French scientist, M. A. Muntz, declares as the result of a series of experiments devised to test this theory, that in dry seasons this defoliation is distinctly detrimental. It removes the store of food material which is available for the grapes during the period of ripening. Even in wet seasons no beneficial results seem to result from defoliation.

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NEW FORMS OF BACTERIA.—Some remarkable new forms of bacteria have been found by Dr. A. Famintzine in the aquarium of the Botanical Laboratory of the Imperial Academy at St. Petersburg. The genus *Nevskia* has been established to include these organisms, and *Nevskia ramosa* is believed to be the first representative among the *Schizomycetes* of the colony-forming organisms with branched processes.

THE CULTIVATION OF PERFUME PLANTS.—At the perfume farm of the South Australian Government at Dunolly, oil of peppermint, which has hitherto been obtainable of fine quality only from Mitcham and Wallington, in Surrey, has been distilled there of good quality, as well as oil of wild thyme, oils of laurel, tansy, anise, lavender, verbena, etc., and an extract of vanilla which has attracted a considerable amount of attention. Very successful experiments are reported with the leaves of the iron bark, which has not hitherto been considered of any value in the production of oil; and several other species of eucalyptus have been tried, all of which have yielded fragrant oils. The operations on this South Australian flower farm are attracting much attention in other colonies, where the cultivation of these plants promises to become an important industry.

J. R. G.

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NOTES AND NOTIONS.

BY RICHARD WADDINGTON,

President of the Half-time Council of Teachers.

WHAT is freedom of classification? At Whitehall it means the almost unrestricted power of the teacher to mould the youthful mind at the rate dictated by the experience gained by daily contact with the scholar; while at South Kensington it means the delegation of the power to a gentleman who spends from one to two hours a year in the school, and whose chief qualification was ability to hoist the mainsail, or holystone the quarter-deck.

* * * * *

SOUTH KENSINGTON seems to exist in an educational twilight. The teacher must enter the reason on the Drawing schedule, because

(*a*) The incentive to get the scholar forward in these latter (standard subjects) that he may go to work is absent;

(*b*) There is a strong inducement to keep scholars back, as thereby they would do better in the examinations, and the grant would be increased; and

(*c*) It would be very unfair in schools which pushed their scholars on and only obtained 'good'; while those which kept them back obtained 'excellent.'

* * * * *

THE last two of these three reasons must have been 'loaned' from 'My Lords' of Whitehall. The experience of the present Code belies their insinuations. Of the other reason the experience of every teacher vitiates its potency. No wonder 'age and attendance' hangs fire if, in the opinion of the Department, the great safeguard against abuse of the power to classify lies in the parent's desire to see the child through the labour standard. Has General Donnelly more than a passing acquaintance with the average parent? The true ambition of parents, teachers, scholars, and managers will always be the best preventive of abuse. General Donnelly hinted at the chief source of the Department's timidity—the incompetence of the officials it has created 'Drawing Inspectors.' The Department is aware that it has perpetrated one of the grossest pieces of jobbery extant in these appointments. What possible preparation for examining and reporting upon the pedagogic powers of trained teachers can be acquired 'abaft the cabin,' 'walking the quarter-deck,' 'atween decks,' or 'inspecting and drilling militia recruits'?

THE struggle to put the teaching of drawing on a rational basis emphasises the necessity of a Teachers' Union. Every Unionist must be grateful to Messrs. Greenwood, Wild, and Organ for the ability and pertinacity with which they pressed the teachers' views at the interview with General Donnelly. Slowly, but surely, we near emancipation. Courage, pertinacity, and loyalty will break down even the Science and Art Department's distrust. So far we have wrung from them—

1st. If it should at any future time be found expedient or necessary to impose the condition that the teacher of drawing should hold a certificate from the Science and Art Department, teachers of elementary schools who were certificated as such, and engaged in teaching before 1st January, 1893, will be exempt from its operation.

2nd. An easier certificate—very much on the lines of the old 'D.'

3rd. Where the award is reduced on account of the classification, it must be stated in the report.

4th. The second-class passes already obtained to count towards the new 'D.'

* * * * *

Now, what I want to know is, 'Will the Department stamp the certificates of the teachers before 1893, to relieve them from the disqualification brought about by the Department's previous action?'

* * * * *

HERE is the report on a school near Bolton for the year 1846:—

'The late mistress left with her salary unpaid, and the present curate has only been able to procure the teaching of a young weaver, untrained. No reading books but Bibles, and these in very bad condition. Repeated the tables *and the first twenty of the Thirty-nine Articles, but of the sense of the latter they had no idea.* The master keeps an evening school twice a week. He attends an evening school at Bolton, for which *he pays 9d. out of the 7s. earned here.* He lives with his parents.'

* * * * *

WHAT a picture! And only fifty years ago! Even compulsory drawing would be preferable to the first twenty of the Thirty-nine Articles. What a consolation it must have been for 'My Lords' to know that the untrained weaver who so nobly fought with ignorance, and endeavoured on 7s. a week

'to secure
For all her children whom her soil maintains
The Rudiments of Letters,'

lived with ..is parents!

* * * * *

VISCOUNT SHERBROOKE, better known as Robert Lowe, whose death, at 81 years of age, carries the educationist to the inauguration of the darkest chapters in the history of modern primary education, was a remarkable figure in English political life thirty years ago. A great scholar, but by no means a great statesman, he passes away unwept, unhonoured, and unsung by the primary school teachers. 'The evil that men do lives after them,' is true of the author of the match tax, and the evil wrought by Robert Lowe, at the the instigation of the Newcastle Commission, still lingers. Caustic, epigrammatic, and often eloquent as a speaker, his want of sympathy with the progressive democratic

spirit of the age served to make him the ideal spirit of a 'cave' rather than a popular constructive statesman. Let us hope that the perverse and unpopular Lord Sherbrooke will be a warning to any future compiler of codes at Whitehall. If we cannot pay tribute to the educationist, at least we admire the courage and pertinacity with which he struggled with a great affliction.

* * * * *

In view of the approach of January 1st when under the Factory and Workshop Act the age for half-time employment will be raised to eleven, several School Boards have applied to the Department to allow them to amend their bye-laws by raising the age for all half-time to eleven. The School Attendance Committee for the Borough of Haslingden amended their bye-laws in this manner, and they were approved by 'the Queen's Most Excellent Majesty in Council,' June 28th, 1892. What is most surprising is that the standard for half-time is to remain the *second*.

* * * * *

Mr. Home Secretary Matthews has postponed for a year the 'minute' which would have come in force on the 4th inst., and which would have raised the full-time standard under the Factory and Workshop Act in districts where the exemption standard was above the fourth. It is to be hoped that during the next session an Act may be inscribed on the Statute Book entirely re-modelling the qualifications for labour on the lines suggested by the N.U.T. I understand Sir R. Temple is willing to take charge of a Bill drafted on Age and Attendance lines. Teachers commencing a new school year would do well to carry forward the last year's attendances into the new registers, since there is a concensus of opinion in favour of this solution.

* * * * *

Shortly the first year's experience of Assisted Education will be complete, and the most drastic clause will come into force. What will be the demand for the formation of School Boards? Several towns, especially two or three manufacturing towns in the North, where the formation of a School Board has been successfully resisted under the Act of 1876, will find a more or less acute demand after the first of September. Clause V. provides that where there is an insufficient amount of public school accommodation, without payment of fees, for children over three and under fifteen years of age, for whom such accommodation is desired, Section nine of the Elementary Education Act, 1870, shall provide the remedy. This section provides—

1st.—Inquiry by the Education Department.

2nd.—Where additional accommodation is in course of being supplied with due despatch, the requisite time will be allowed for the completion of the work.

3rd.—If the deficiency remains unsupplied, and the neighbourhood is in a School Board District, the School Board will be called upon to supply the deficiency, or, if there be no School Board the powers of the Education Act, 1870, will be brought into play, and, after the usual statutory notices have been issued, a School Board will be ordered for the district, and, of course, that newly-created authority will be charged with the task of supplying the full accommodation declared to be needed.

What has been the effect of the Act? It can hardly be said to have had more than a spasmodic influence on the regularity of the scholars. Improvement in this direction demands more effective legislation in another direction. It will be interesting to see the result of the inquiry of the N.U.T. as to its effect on the teacher. In thousands of voluntary schools, where the financial stability has not been threatened, the treasurer has been seriously inconvenienced by the mode of payment. In many schools the fees were used to meet the monthly demands of the staff to some extent. Is there any legitimate reason for not paying the 'Fee grant' in advance? Any excess paid during the year could be deducted from the Annual Government Grant.

* * * * *

During the next three months the members of the N.U.T. will be asked to give expression to their views on the particular phase of Electoral Districts they prefer. Three schemes will be before them for their consideration—the scheme prepared by the Committee of the Executive; the 'three member' scheme proposed by Mr. Macnamara; and the scheme prepared by Mr. Jenkins. To pile up objections to each and every one of these schemes would be by no means difficult. If we are to have Electoral Districts, then we must be satisfied with a scheme by no means perfect in the initiation. The 'three member' scheme, although it hardly meets the direction of Conference, is most likely to meet the future requirements of the Union. By such an arrangement much of the local work of the Executive might be delegated to the centres thus created.

* * * * *

The Executive's Scheme contains many anomalies. To draw up such a scheme demands extensive local knowledge, and a close acquaintance with the varied interests of each local association. The Metropolitan compromise at once destroys the principle of the Cardiff resolution, and can only be accepted as the simplest way out of a very difficult situation. To maintain anything approaching equal electoral districts is well nigh an impossibility, even with a revision every three years. However, in view of the many advantages of this new departure, patience and forbearance will be necessary on the part of the reform party. Personally, I have anticipations of increased vitality and diffused enthusiasm from any fairly equitable scheme.

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The mode of electing the Executive may produce difficulty. The Executive will be elected and the result declared by the first Saturday in February, but the new Executive will not come into office until after the Easter Conference. If a large number of the members suffer defeat in January, they will still direct the policy of the Union for the next two or three months.

* * * * *

There must be many interesting and amusing 'Notes' securely shielded from prying observation in the Log Books. I have just fallen on a very remarkable specimen—

'May 18th, 18— Had to administer corporal punishment to Walter McLaghlan for the following:—The school was disturbed by a loud cry, which was discovered to come from Arthur Roberts. I soon elicited the fact that the cry, was caused by Roberts

sitting on a pin, which McLaghlan had intentionally placed on the seat.

'N.B.—This is the pin.

And there, inserted in the page, was the terrible and convincing evidence of the guilt of the perfidious Walter.

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If any of my readers have interesting extracts I shall be pleased to receive them at St. James's, Bolton.

* * * * *

I EXTRACT the following from the presidential address of Mr. H. De Bell, Bolton. In protesting against much of the jargon that passes for scientific teaching, he says :—'It reminds one of the story, which some of you have perhaps heard, of the manager who visited a school renowned for its number of passes in Elementary Physiology. The master, to show his visitor what a profound knowledge of the subject his pupils had, called upon one of his precocious girls and requested her *to go through her bones*. The girl then, parrot-like, rolled forth occipital, parietal, and so on, from the crown of her head to her toe, much to the visitor's delight, who, at first, thought that the girl was going to do something on a parallel with jumping out of her skin.'

* * * * *

SOME day we shall get a decimal system of weights and measures. In the meantime the following is not a bad description of the conglomeration of absurdities :—

SENSELESS WEIGHTS AND MADDENING MEASURES.

A gallon isn't a gallon. It's a wine gallon, or one of three different sorts of ale gallon, or a corn gallon, or a gallon of oil ; and the gallon of oil means seven and a half pounds for train oil, and eight pounds for some other oils. If you buy a pipe of wine, how much do you get ? Ninety-three gallons if the wine be Marsala, ninety-two if Madeira, a hundred and seventeen if Burcellas, a hundred and three if Port, a hundred if Teneriffe. What is a stone ? Fourteen pounds of a living man, eight of a slaughtered bullock, sixteen of cheese, five of glass, thirty-two of hemp, sixteen and three-quarters of flax at Belfast, four and twenty of flax at Downpatrick. It is fourteen pounds of wool as sold by the growers, fifteen pounds of wool as sold by the wool staplers to each other. There are seven measures in use to define an acre. A hundred-weight may contain a hundred, a hundred and twelve, or a hundred and twenty pounds. A hundred-weight of pork is eight pounds heavier at Belfast than at Cork. A man may live by selling coal at a less price per ton than he paid for it at the pit mouth. A ton of coal at the pit mouth varies from twenty-two to twenty-three hundred-weight of a hundred and twelve pounds each. Of cheese, thirty-two cloves (of eight pounds each) make a wey in Essex, forty-two in Suffolk. We walk in this United Kingdom by the measure of four sorts of miles, an English mile being two hundred and seventeen yards shorter than a Scotch mile, and four hundred and eighty yards shorter than an Irish mile, and the geographical mile being another measure differing from all three. Our very sailors do not mean the same thing when they talk of fathoms. On board a man-of-war it means six feet, on board a merchantman five feet and a half, on board a fishing vessel five feet.

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IT is high time something was done to awaken the public conscience to the state of teachers' residences in the rural districts. The anxiety of the Government concerning these dwellings seems to have ended with the granting of a Government subsidy for their erection. School buildings are regularly visited, but no supervision is exercised over the School Houses. Here is a case where the master has to beg his domestic water in the village, the only available pump being for the time being in the hands of the enemy—the village publican.

* * * * *

NO member of the new Ministry has a more difficult task than Mr. Arthur H. Dyke Acland, the Vice-President of the Committee of Council on Education. Mr. Acland made his mark twelve months ago in the discussion of the Assisted Education Bill. Educated at Rugby and Christ Church, the bursar of Balliol took 'orders,' and was for some time engaged in Secondary Education. Although a tutor at Keble, and an examiner in 'smalls,' he forsook the parson and the pedagogue for the politician. His position is an unique one since, although the Earl of Kimberley is nominally the head, the new Vice-President enjoys a seat in the Cabinet, and it is probable that Earl Kimberley will find that India engrosses all his spare moments. In succeeding the best Education Minister that ever ruled at Whitehall, Mr. Acland has the best wishes of every teacher in the country. In greeting the new, let us not forget our thanks to the old Vice-President. Sir William,—Whig, Tory, Unionist, Radical, Conservative, and Liberal pedagogues regret to lose you!

* * * * *

IF there is any significance in the inclusion of the Vice-President in the Cabinet and in allying the President of the Council with the Secretary for India, I believe it is rather an evidence of the Premier's dislike of large Cabinets than of any particular line of educational policy.

* * * * *

I VENTURE to anticipate that the policy of the Department will tend to :—

1. Popular control of all schools (Voluntary and Board).
2. Extension of Technical Education in our Day-schools.
3. A State-aided system of Secondary Education.

* * * * *

MR. ACLAND is an advanced educationist, and, if his mind is as open to reason as his predecessor's, he may do much to improve both Primary and Secondary Education.

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WE have the pleasure to inform our readers that MR. GREGORY'S NEW ELEMENTARY PHYSIOGRAPHY is now ready, Price 2s. 6d. This is the most comprehensive work ever issued on the subject at the price. Specimen copy post free upon receipt of TWO SHILLINGS.

RECENT INSPECTION OF A YORKSHIRE SCHOOL.

MARCH, 1892.

Boys.

H.M.I. arrived about 9.30 a.m., the time specified.

He first inquired what number were present, and then the names of the various teachers.

Afterwards he required all the apparatus to be got out used in teaching Geography and Elementary Science.

Teacher's note books in Science were examined, and then each teacher requested to examine on one of the subjects in the notes.

Reading by sample, large number of questions to test intelligence.

Standard II.

Dictation.—'After he had gone to bed that night he still thought about the wonders of which he had heard. At last he fell asleep, and as he slept he dreamed a dream. He thought that he was looking out of a window, and that he saw a great globe.'

Geography.—III.

Map of county before class (Yorks).
What are the Wolds?
What is the River Aire?
What is the Wash?
Largest opening on the East?
Which Riding are most people in? Why?
What do we send in ships from Yorks?
What do people on the East do?
What comes to us in ships?
Where does the Aire rise?
What are the 'Colliers' on the Thames?
Where does the Thames rise?
Which bridge is nearest the sea?
What is Yorkshire noted for?
What river running through Yorks rises in the Wolds?
What are boats laden with at London?
What are the Wolds made of (chalk)?
Tell some other hills of the same kind.
Where does cotton come from?
What are pleasure-boats?
Where does tea come from?
Where do we find coal?
Where lakes?
What are ships loaded with that go to London?
What county is Manchester in?
What separates Lancashire and Yorkshire?
What is Sheffield noted for?

Geography.—IV., V., VI.—Colonies. Blank Map of India and Further India in front.

What shape is India?
What country N. of Himalaya?
Country W. of Indus?
Do hot or cold winds blow across India?
How do they break when they reach Himalaya?
What is that part by N. of Indus?
What is that part by S. of Indus?
What is this river (Nerbudda)?
Who knows what happened a short time ago in Burmah?
What is this (Mandalay)?
What is this river (Irawaddy)?
Country N. of India?
How does the wind strike the Himalaya (right angles)?
Where is Cashmere?
Indian Desert?
What is the wind called that blows against the Himalaya?
What passes into Afghanistan?
What kind of wind blows across Arabian Sea?
Town at mouth of Irawaddy?
How high is the highest mountain in India?

Arithmetic.—Standard I.—Had three sums.

Standard II.—Short Division, Subtraction, Multiplication, and Problem. A man had 5 baskets, each containing 39 eggs. He sold two dozen. How many left?

Standard III.—From card.

Nine cottages and field cost £1,010, the field alone cost £10. What did each cottage cost?

A man sold a cow for £16 10s., and bought a pony for £12. He had £9 2s. 6d. when he was going home. How much had he when he left?

112,000 ÷ 102.

Standard IV.—A man and his son earn £3 10s.; the man earns 6 times as much as the son. How much did each earn at the end of a year of 52 weeks?

What is the difference between £1,209 19s. and £1,208 10s. $3\frac{3}{4}$d.?

£349 19s. $11\frac{1}{2}$d. × 79.

19 tons 7 st. to lbs.

£107 17s. 6d. ÷ 25.

28 panes of glass in window, each pane is 360 sq. in. Find cost of glass at 3d. per sq. ft.

15 cwt. of sugar at $3\frac{1}{2}$d. per lb.

If grocer buys 15 cwts. 16 lbs. of sugar at 3d. and sells at $\frac{1}{4}$d. per oz., what does he gain?

Man sells $17\frac{1}{2}$ galls. per day at $2\frac{1}{2}$d. per qt. How much would be get in the month of May?

4,070 threepenny-pieces to half-crowns.

£556,763 3s. $7\frac{3}{4}$d. ÷ 396.

£30,763 17s. 2d. × 34.

3 barley-corns measure an inch. How many in half a mile?

Standard V.

$\frac{1}{2} + \frac{1}{6} + \frac{3}{4} - \frac{6}{10}$.

2,108 tons at £2 11s. $9\frac{1}{2}$d. a ton.

$26\frac{1}{2}$ tons cost £29 19s. $11\frac{3}{4}$d. What would $42\frac{3}{4}$ tons cost?

3 miles 5 fur. 37 po. at 18s. $9\frac{3}{4}$d. a pole.

Man bought 46 bus. 2 pks. for £6. One quarter of them were bad; he sold the rest at $4\frac{1}{2}$d. per gall. What did he lose?

39 men do work in 25 days 5 hours. How long will it take 65 men?

87 tons 17 cwt. 98 lbs. at £2 6s. 8d. per ton.

Standard VI.

Find interest on £1,000 for 3 months at 5 per cent.

·1029 ÷ 1·68 and write down your answer when ·00168 is the divisor.

$$\frac{\frac{1}{3} + \frac{4}{5} + \frac{5}{8} + \frac{7}{15}}{20 - \frac{3}{5}}$$

What sum of money will gain £8 6s. 6d. interest in 3 years at $2\frac{1}{2}$ per cent.?

When $\frac{3}{5}$ of the contents of a purse have been spent $\frac{1}{4}$ of the remainder was found to be 5s. 10d. How much was in at first?

All examined by sample.

STANDARD IV.

Dictation.—The lover of Nature, whose thoughts are given to the examination of the earth's wonders, cannot at night and in the long darkness of winter find those interesting natural objects of which he may be in search. Yet these are the very seasons when the heavens offer us a fruitful source of amusement, and reveal to our gaze so many subjects upon which we may employ our thoughts.

STANDARD V.

Composition.—A minister was once going to visit one of his flock on a washing-day. The woman did not want to appear before her minister in her washing-dress. She told her little boy that when he came he was to say she had gone out. She then got behind the clothes-horse, but she did not know that her feet could be seen. The minister came, and the little boy did as he was told. Then the minister said: 'Tell her when she comes back to take her feet with her the next time—that they are the most important things for walking.'

DIVISION III.

d' s, d, t, d, m r s f m d' t d' r' m' f m' d' s, d,

Ear—m r d s f m l t d

l : — :l.l | l : l : l | l : l : | l : l : ‖

DIVISION II.

d s m r d s m s l t d' r' d' m d.

THE 1893 SCHOLARSHIP EXAMINATION.

BY DR. GEORGE BEACH, M.A.,

Co-Author of 'A Manual of our Mother Tongue,' 'A Girls' Arithmetic,' Author of 'Elements of English,' 'Entertaining Readers,' etc.

1. PRELIMINARY REMARKS.—

While this Course is written primarily for Pupil Teachers, and will be a detailed guide for the studies of their last year of apprenticeship, it will also incidentally, yet methodically cover the whole syllabus from Candidature up to Queen's Scholarship. Therefore, those students who contemplate entering the profession without having been Pupil Teachers will also find it especially suitable to their needs.

Important as the Queen's Scholarship Examination always has been, recent regulations have made it almost a necessary preliminary condition before anyone can compete for a Certificate.

Candidates for certificates must be examined twice, and must have been for at least one year employed as Assistant Teachers in inspected schools under Certificated Teachers, and must in this situation have obtained a favourable report from an Inspector on their skill in teaching, reading, and recitation.

Only (*a*) such Assistant Teachers, (*b*) Students in Training Colleges, and (*c*) Provisionally certificated Teachers are allowed to sit the Certificate Examination.

Now the qualification necessary for the post of Assistant Teacher is success at the Queen's Scholarship, the essential condition of entering a Training College is the obtaining of a Queen's Scholarship, and the main avenue to the provisional certificate is a First Class Scholarship.

The only other method of securing a Certificate is passing some University (or similar examination) in lieu of the Scholarship.

Thus we may fairly state that by far the broadest and most frequented path to the Certificate leads through the Scholarship gate, whatever may be its ramifications afterwards.

Add to all this that there is now no Fourth Year Examination, except the Scholarship, and it will be seen that its professional importance can scarcely be over-rated.

No one under eighteen years of age may sit, but there is nothing as yet to prevent a person of seventy trying. However, it should specially be borne in mind that no candidate will be again examined who has failed twice, but in this restriction any failure before July, 1891, is not included. Should a candidate pass, but yet too low down on the list to secure entrance into a Training College, there is nothing to prevent him trying as often as he please until he achieve the desired position.

Pupil Teachers at the end of their apprenticeship either intend to leave the profession or to continue in it. In the first case they are not compelled to sit the Examination at all; in the second case they must attend that Scholarship Examination which takes place next preceding the completion of their engagement.

The next examination will be held on Wednesday, Thursday, and Friday, July 5th, 6th, and 7th, 1893. All the Training Colleges are centres for the purposes of this examination, and in addition special centres are established at the following towns:—

NORTH-EASTERN DIVISION.
Newcastle-on-Tyne.
South Shields.
Sunderland.
Durham.
Bishop Auckland.
Stockton.
Saltburn.
Scarborough.
Hull.
Bradford.
York.
Leeds.
Wakefield.
Huddersfield.
Sheffield.

NORTH-WESTERN DIVISION.
Carlisle.
Whitehaven.
Barrow-in-Furness.
Wigan.
Blackburn.
Preston.
Liverpool.
Ramsbottom.
Rochdale.
Bolton.
Salford.
Manchester.

NORTH CENTRAL DIVISION.
Chesterfield.
Retford.
Nottingham.
Wolverhampton.
Dudley.
Walsall.
Stoke-on-Trent.

WEST CENTRAL DIVISION.
Shrewsbury.
Hereford.
Gloucester.
Bristol.
Coleford.
Bath.
Taunton.
Worcester.

WELSH DIVISION.
Oswestry.
Wrexham.
Rhyl.
Aberystwith.
Blaenau Festiniog.
Haverfordwest.
Merthyr Tydvil.
Swansea.
Cardiff.
Pontypool.

EASTERN DIVISION.
Grimsby.
Beccles.
Ipswich.
Norwich.
Yarmouth.
Lynn.
Cambridge.
Colchester.
Watford.
Bedford.

EAST CENTRAL DIVISION.
Birmingham.
Leamington.
Coventry.
Leicester.
Northampton.
Peterborough.
Swindon.
Oxford.
Reading.

SOUTH-WESTERN DIVISION.
Southampton.
Newport (I. of W.).
Portsmouth.
Jersey.
Bournemouth.
Sherborne.
Barnstaple.
Exeter.
Plymouth.

SOUTH-EASTERN DIVISION.
Canterbury.
Rochester.
Ashford.
Brighton.
Tunbridge Wells.
Guildford.
Croydon.

METROPOLITAN DIVISION.
London.
Stratford.

Formal application for permission to sit must be made to the Department at such a time that all the requisite

information on 'FORM 13' is forwarded to it before 1st MAY, 1893.

This information will state what Language (if any) the Candidate intends to be examined in; also whether (under Footnote of Column 4, Schedule V. of New Code) Latin has been substituted in the stead of English Grammar and Composition, and what special centre or Training College the Candidate will attend.

The Department declines to conduct any part of the correspondence requisite to ascertain the consent of the Principal of a Training College to receive any particular Candidate.

The exact addresses of the various examination rooms at the special centres will be communicated in June to the Candidates concerned. If nothing be heard to the contrary Candidates may assume that seats have been reserved for them.

The first two pages of Form 13, which the Department has forwarded on application, must be carefully preserved and given up to the Inspector holding the examination.

He will supply paper for the use of Candidates, but they must furnish the pens which they generally use. Women Candidates must also provide themselves with scissors, thimble, pins, an inch tape measure, sewing, marking, and darning cotton, and suitable needles.

No Candidate must bring into the examination room any instrument, or material for writing, except pens, ink, pencils, knife, and india-rubber.

Special attention should be paid to the fact that Candidates employed in any capacity in Public Elementary Schools must be reported on for Reading, Recitation, and Teaching by H.M. Inspector at the examination of their schools which precedes the Queen's Scholarship.

After the expiration of apprenticeship, and pending the issue of the Scholarship List, an Ex-P.T. may take an Assistantship; but in the event of failure, he ceases to be recognised as on the staff after the end of the month in which the result is announced. He may, however, upon application made to the Education Department, be re-bound till July 31st, 1893, in the school where he is serving, and then his status at the examination will be that of a Fourth Year Pupil Teacher.

From what we have before stated, it will be gathered that all Pupil Teachers who complete their engagements between 31st July, 1893, and 30th June, 1894, must compete at the ordeal in July next.

From this it follows that some Pupil Teachers who attend the Third Year examination in April will also sit for the Scholarship in the ensuing July.

This will be a privilege to the acute and industrious, but it is only optional, and is in no wise compulsory; for in order to obviate any injustice or hardship, any Pupil Teacher who so wishes may postpone the examination for a year, or a portion thereof, conditionally that the Managers are willing to retain his services.

This being so, an application must be made to the Secretary of the Education Department to extend the indentures, so that they may be terminated on the 31st day of July following the Scholarship examination attended.

Unhesitatingly we advise everyone wishing to secure a Certificate to qualify themselves thoroughly by entering a Training College. We wish not to decry those persevering teachers who have often, through much self-denial, obtained their goal by another route; yet it must be remembered that good as such a Teacher may be, he would have been better had he been in residence at a Training College.

Moreover, situations more in number and higher in remuneration, a more elevated social and professional status, a greater freedom from provincialisms and angularities, a wider acquaintance with methods of study and means of improvement, a more evenly-balanced mind and temper, and a greater leaning towards professional union results from the two or three years at a Training College.

These advantages, however, are not for all even of the successful ones. Only First and Second Classes are eligible for College life; Third Classes must be content with Assistantships.

Finally, not all eligible are fortunate enough to secure places; for so great is the competition, especially for the Metropolitan Colleges, that unless a high position in the First Class is a moral certainty, Provincial Colleges should be selected, and these without any delay whatever.

Note also, that a Candidate who has at the Queen's Scholarship Examination passed with exceptional credit in Geography or History is released from the obligation to take up the subject again at the subsequent examinations for Certificates, and may substitute for each subject in which he has passed a Language or a Science.

II.—OPTIONAL SUBJECTS.

These are they that secure extra marks, and without which very few (and these through much tribulation) can enter into a First Class. Music, Language, Science, and Drawing are they called.

(*a*) *Music.*—The examination will be a practical one in *Time* and Tune.

i.—*Time* will consist in sol-faing or reading, without musical intonation, a unison passage of one or more measures; *or* giving the time-names of such measures as may be rendered by the Examiner

ii.—*Tune* will comprise the naming of notes according to their pitch which the Examiner may sound, or sounding passages of two or more notes in a given scale from dictation.

(*b*) *Language.*—A paper will be set in—(i.) Latin, (ii.) French, (iii.) German, (iv.) Greek, (v.) Hebrew.

Very few attempt the Greek or German, but many take French, less take Latin, and a certain section take Hebrew, which has only been added this year. The passages set in 1893 will be from 'Caesar de Bello Gallico,' Book I.; Xenophon's Anabasis, Book I.; 'La Jeune Sibérienne' by Le Maistre; 'Die Karawane' by Hauff. Of the French book, Messrs. Hughes and Co. have published a most helpful edition by that most successful teacher and littérateur, Professor Darqué.

(*c*) *Science.*—Marks will also be given to any Candidate who at one of the examinations held in May of each year by the Department of Science and Art has taken a first class in the elementary stage, or passed in the advance stage of one of the following subjects:—Mechanics of Solids and of Fluids; Chemistry; Animal Physiology; Sound, Light and Heat; Magnetism and Electricity; Physiography; Botany; Principles of Agriculture.

Observe that—

i.—Second Stage Mathematics does not count.

ii.—Information respecting the means of instruction, and the places and times of examination, will be afforded on application by letter to 'The Secretary, Department of Science and Art, London, S.W.'

iii.—Physiography is the most helpful subject to attempt, as it greatly assists subsequent work.

Candidates may obtain marks for both *one* Language and *one* Science, but not for more than one.

(*d*) *Drawing*—Pupil Teachers who during their engagement successfully work, in any order, papers in Freehand, Geometrical and Perspective Drawing, are credited with marks in any future examinations for Queen's Scholarship or Certificate.

Students sitting at the next May examinations will be allowed the benefit of any successes both in Drawing and Science, although they may not have heard the results before the Scholarship Examination.

III.—TEXT BOOKS.

We recommend the following:—

Miscellaneous.—Heller's Code, Stormonth's Dictionary, Dunstan's 'Teachers' Manual of Music,' Hughes's Scholarship Copy Book, Hughes's 'Art of Handwriting,' Halford-Hawkins' 'Art of Reading and Recitation,' Parkin's 'Round the Empire,' 'Laws of Every Day Life,' 'The Citizen Reader,' and 'This World of Ours.'

School Management.—Gladman's 'School Method and Specimen pages of 'The Durham Register.'

Geography.—Gregory's Physical and Astronomical Geography, Gregory's Physiography, Brook's Geography, W.

and A. K. Johnston's 'Multum in Parvo' Atlas, Hughes's 'How to Draw a Map,' and Arnold's 'Memory Maps' will be found to be very useful.

History.—Ross's Larger History, Blanchard's 'Notabilia,' Curtis' Date Book, McLeod's Constitutional History.

English.—Dr. Beach's 'Elements of English,' Dawson's Paraphrasing, Nelson's 'Lives of English Authors.'

Arithmetic.—Wollman's 'Teachers' Arithmetic,' Dixon and Beach's Arithmetic, Pendlebury's.

Algebra.—Knight's Factors, Hamblin Smith's Algebra.

Mensuration.—Todhunter's.

Domestic Economy.—Hughes's Domestic Economy, Mrs. Beach's Domestic Economy, Parts I. and II.

Euclid.—Deighton's, Egan's Exercises, Part I.

Sewing.—Miss Jones' Needlework Book.

We entreat our Readers to purchase the necessary works. They cannot do without them, and they must remember they are entering a PROFESSION without having paid any premium.

IV.—ANSWERING QUESTIONS.

(*a*) Every Candidate should methodically answer suitable questions. From week to week we shall furnish these in our columns and do indeed provide two test sets for the present month.

But beyond that they should be 'COACHED UP.' Passing Examinations and preparing others for examinations is now a fine art. Therefore all who desire to do well should join some class, if possible, where they can get *personal* tuition.

To some, however, such chances are not vouchsafed, and as the next best thing they should be tutored by correspondence, either *by registering themselves as members of our class*, or otherwise.

(*b*) *Model Answers* should be very carefully studied. From them there is much to be learned, for style and method count greatly, yea inordinately, in examinations. Just as the man of rough and rigid virtue is often eclipsed by the polite suavity of a less worthy person, so in examinations the industrious and acute who have not the examination polish have frequently to give place to the candidate more artfully ignorant.

Here is a good opportunity to confess our own *editorial shortcomings.* We regret to say that some ERRATA crept into the Model Answers of the Scholarship Questions published in our last issue. But of these we make a clean breast and crave forgiveness and plenary absolution. Truly, too, we have done our penance in having day after day to cry '*Peccavi*' or '*Mea culpa*' to numerous correspondents who have been 'on our track.' Yet to these we are very grateful, for we had rather be found out in a fault, than enjoy an unrighteous impunity, knowing that 'Consuesse deos immortales, quo gravius homines ex commutatione rerum doleant, quos pro scelere eorum ulcisci velint, his secundiores interdum res et diuturniorem impunitatem concedere.'

Agreeing with this sentiment of Cæsar's, we acknowledge that the 'immortal gods' are good to us in conceding to us a prompt detection and rectification wherever and whenever we err.

Will all who find any errors kindly apprise us, so that we may at last be perfectly perfect?

(*c*) i. By a Printer's Error, 6d. was put for 9d. in the working and answer of sum 4, page 103.

ii. Answer to Staff Notation Question 4 is inaccurate in signature, owing to a misprint in the Scholarship Paper itself. The question asked by the Education Department was practically this:—Re-write the following in *half* the time of the given passage *doubling* (*halving?*) the value of each note and rest. Which is absurd. Q.E.D.

iii. Page 105, Question 2 *b*, read in first bar E natural, and in fourth bar F sharp.

iv. Page 106, Question 1, last half, omit the two last blank bars, and read in 2nd measure m. instead of m :.

v. Page 106, Question 3, interval (4) read Diminished Seventh instead of Major Sixth; and interval (5) read Diminished or Imperfect Fourth instead of Major Third.

vi. In answer to 4 (*a*), substitute t_1 for t.

(*For Correspondence see end of Certificate Article.*)

SELECTED SCHOLARSHIP QUESTIONS.

WEEK ENDING 17TH SEPTEMBER, 1892.

1. Analyse fully the following extract and parse the words in italics—

> *Milton*! thou *shouldst* be living at this hour:
> England hath *need* of thee; she is a *fen*
> Of stagnant waters; altar, sword, and pen,
> *Fireside*, the heroic wealth of hall and *bower*,
> Have *forfeited their* ancient English dower
> Of inward happiness. *We are* selfish men.

2. Show by the above example how analysis helps us to parse correctly.

3. Draw a full map of Wales, marking the rivers, lakes, mountains, principal towns, etc.

4. Explain the phenomenon of the seasons.

5. What were the chief events in Britain during the administration of Suetonius Paulinus and Julius Agricola?

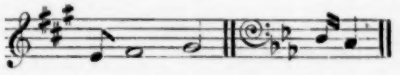
6. Give a short sketch of the British Constitution.

7. What rules have you learned to observe in giving out Dictation?

8. Write Notes of a Lesson illustrating the following passage:—

'*The history of our country during the last hundred and sixty years is eminently the history of physical, of moral, and of intellectual improvement.*' (Macaulay.)

9. Write the pitch names (C, B, etc.) and the duration names (crotchet, etc.) of the following notes, and write the signs for rests of corresponding value:—



OR

Re-write the following (*a*) doubling the value of every note and rest, and (*b*) again, halving the value of every note and rest:—

| m: | r:— | s:— .d' | t .s : d ‖

10. Find, by *decimals*, the rent of 89 acres 1 rood 30 poles at £2 17s. 6d. per acre. Ans. £832 2s. 7·875d.

11. A clerk copied 62·5 instead of ·625 of a certain sum, and the error amounted to £6,187 10s. What was the sum? Ans. £100.

12. Write out clearly and concisely rules for mentally—
   (*a*) Finding the value of 40 doz. articles at a given price per article.
   (*b*) Multiplying a given number by 375.
   (*c*) Dividing a given number by 75.

13. (*Men only.*) Write out Euclid I. 4—

If the straight lines joining a vertex of a triangle to the points of trisection of the base be equal, the triangle is isosceles.

(*Women only.*) Name and describe fully all stitches used in completing a woman's night-dress.

14. (*Men only.*) Write out Euclid II. 1—

If ABCD is a straight line, prove that the rectangle AC.BD is equal to the rectangles AB.CD and BC.AD.

(*Women only.*) What dangers to health are likely to accrue in a school where there are no lobbies or porches for clothes, and where the desks are flat, occupy nearly all the floor space, and face the windows?

15. (*Men only.*) The sides of a quadrilateral are 51, 140, 148, 149 feet respectively, and the angle between the first two is a right angle. Find the area to two places of decimals.

Ans. 1314·06 sq. feet.

(*Women only.*) How would you clean saucepans, bread-tins, and water-bottles?

16. (*Men only.*) Prove that—

$$(x+y+z)^3 - 6xyz \equiv (x+y)^3 + (y+z)^3 + (z+x)^3 - x^3 - y^3 - z^3.$$

17. (*Men only.*) Divide—

$\frac{1}{2}a^3 + \frac{3}{4}a^2x - 2x^3$ by $\frac{1}{2}a + x$. Ans. $a^2 + ax - 2x^2$.

WEEK ENDING 24TH SEPTEMBER, 1892.

1. At which periods, and in connection with what events, in the history of this island did the most important changes take place in the language of the inhabitants? Illustrate your answer.

2. Examine and illustrate the etymology of any five of the following words:—

Own, native, whose, heart, foreign, minstrel, raptures, titles, boundless, claim, wretch, concentred.

3. Give a short account of six of the principal cities of the United States, their position and commercial importance.

4. Explain the meaning of the terms Antipodes, zenith, tropics, meridian. Why does the number of miles in a degree of longitude increase from the Pole to the Equator?

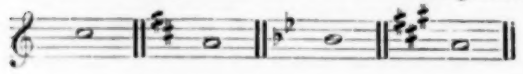
5. Give a short sketch of the making of a new law.

6. Mention times in English History when the countries of the Spanish Peninsula have been (*a*) connected with England by royal marriages, (*b*) by alliance in war, (*c*) in commercial rivalry, and (*d*) at open war against us.

7. What is a *Criticism Lesson?* Under the head of Discipline what points would you attend to in such a lesson?

8. Describe the organisation and teaching staff of the school wherein you were apprenticed—if not an apprentice, then of any other school.

9. (*a*) Write a major third *above* each of the following notes :—



and

(*b*) a minor sixth *above* each of the following notes :—

Describe the intervals (major thirds, etc.) formed by the following pairs of notes :—

d'	m'	ta	d'	se	f
s	l	r	fe	t_1	de

10. A man spends every year ¾ of his income, and invests the rest in annuities at the rate of £90 for every annuity of £3. His income is £600 to begin with. How much will it be at the end of 4 years?

Ans. £627 2s. 3·6d. nearly.

11. An ironmonger bought nails at 18s. 6d. per cwt. and sold them at 3d. per lb. What did he gain or lose per cent.?

Ans. 51⅓ per cent.

12. If a four-oared boat cost £50, what would a six-oared boat cost, if the expense is proportionate to the square of the number of oars?

Ans. £112 10s.

13. (*Men only.*) Write out Euclid I. 8.

The straight line drawn from the middle point of the base of a triangle at right angles to the base will meet the greater of the two sides, not the less.

(*Women only.*) What are the preparations and materials needed for a mixed washing? Discuss the use of soda.

14. (*Men only.*) Write out Euclid II. 2—

On a given straight line describe a rectangle which shall be equal to the difference of the squares on two given straight lines.

(*Women only.*) Cut out and tack together the paper pattern (half-size) of an infant's nightgown.

15. (*Men only.*) The circumference of a circular reservoir is 553½ yards, and the area that it occupies on a map is 1¼ sq. inches. Find the scale on which the map is drawn, measured by inches per mile.

Ans. 10 inches per mile.

(*Women only.*) Name the materials and proportionate quantities for pea soup.

16. (*Men only.*) Find the G.C.M. of—

$x^3 - 3x^2 + 4x - 2$ and $x^3 + 2x^2 - 4x + 1$. Ans. $x - 1$.

17. (*Men only.*) Prove that—

$(1 + x)(1 + y) - xy(1 - x)(1 - y)$ contains $1 + xy$ as a factor, and find the other factor.

Ans. $1 + x + y - xy$.

(*A detailed Routine will be inserted each month.*)

—o—

THE 1892 CERTIFICATE EXAMINATION.

BY DR. GEORGE BEACH, M.A.,

Co-Author of 'A Manual of our Mother Tongue,' 'A Girl's Arithmetic,' Author of 'Elements of English,' 'Entertaining Readers,' etc.

I. Remarks on Routine.

First Year.

(*a*) Parse fully :—*to spend, too, affectation, wholly, perfect, for, that, pruning, do give, large, be bounded, in, that, won,* OR

There, time, every, sight, seem, apparelled, freshness, now, as, hath been, Turn, wheresoe'er, may, which, can see, more. (First Friday.)

(*b*) Parse fully :—*as, that, farther, go, as, high, as, sink, happen, so, fancies, thick, thoughts, could, name,* OR

William, knight, true, Who, Since, ne'er, his, that, help, above, prove, lies foully. (Third Monday.)

(*c*) Parse fully :—*remedies, maybe, whereof, as, must, answer, be left, rather, than, rule, to remove, possible, want,* OR

Be, but, belief, oh! when, stir, Unprofitable, Have hung, I, Wye, wanderer, turned. (Fourth Monday.)

Also analyse the three passages.

Second Year.

(*a*) Parse fully :—*day, When, What, stay, How, shriveling, trump, that, Oh! Thou, stay, though, pass,* OR

better, thus, known, to be contemned, thing, Stands, still, lives, Welcome, air, that, that, worst, here. (First Monday.)

(*b*) Parse fully :—As in First Year (*a*), OR

means, madam, repose, which, that, operative, whose, secrets, aidant, Lest, dissolve, That. (Third Monday.)

II. Bacon's Antitheta.

Essay XXVII.

For.	Against.
1. Friendship does for us the work of fortitude, only more pleasantly.	1. He that links himself in close friendship, fetters himself with new necessities.
2. Friendship gives a sweeter flavour to every blessing.	2. It is the mark of a weak mind to wish to go shares in fortune.
3. It is the worst kind of solitude to have no true friends.	
4. It is a punishment of bad faith to be deprived of friends.	

Essay XXX.

1. Anxiety about health keeps the mind too low, as if it were a suitor to the body.	1. Every recovery from illness is a fresh youth.
2. A healthy body is the soul's host; a sick body is the soul's jailor.	2. Ill-health is a very serviceable excuse, which we are glad to use even when well.
3. Good health is the best forwarder of actions, but weak health keeps holiday too much.	3. Health unites body and soul somewhat too closely.

Essay XXXI.

1. Distrust makes the sinews of Prudence; but Suspicion is a medicine for the joints.	1. Suspicion gives honour its discharge.
2. The man whose faith can be shaken by Suspicion, may be deservedly suspected.	2. Immoderate Suspicion is a kind of civil madness.
3. Suspicion weakens loose faith, but strengthens strong faith.	

III Grammatical Peculiarities of 'King Lear' (compiled chiefly from 'Abbott's Shakesperian Grammar').

Preposition transposed—

'And go the fools *among*.'—I., iv., 194.

Possessive as Antecedent—

Until *their* greater pleasures first be known
That are to censure them.'—V., iii., 2.
'And turn our impressed lances in *our* eyes
Which do command them.'—V., iii., 50.

'Thee' for 'Thou.'—

'Fare *thee* well.'—I., i., 183; IV., vi., 41.
'Haste *thee*.'—V., iii., 251.
'I would not be *thee* nuncle.'—I., iv., 204.

Dative—

'Wind *me* into him.'—I., ii., 106.

Ordinary Forms used Reflexively—

'Thou shew'st *thee* in a child."—I., iv., 282.
'[He] threw *him* on my father.'—V., iii., 213.

The Possessive 'it'—

'It's had *it* head bit off by *it* young.'—I., iv., 235.

"*Thou* is generally used by a master to a servant, or in confidential and good-humoured utterances; but a master finding fault often resorts to the unfamiliar *you*.

Compare the farewell between the noble Gloucester and the supposed peasant Edgar.

Edgar: 'Now fare *you* well, good *sir*.'—IV., vi., 32.
Gloucester: 'Now, *fellow*, fare *thee* well.'—IV., vi., 41."
Note also IV., vi., 8; IV., vi., 32-41.

In the following instance a kiss induces the speaker to pass from the unfamiliar *your* to *thou*.

Goneril: 'Decline *your* head (kisses Edmund). This kiss if it dare speak,
Would raise thy spirits up into the air.'—IV., ii., 23.

Relative Pronoun omitted—

(Nominative) 'Truth's a dog ∧ must to kennel.'—I., iv., 113.
'To ponder on things ∧ would hurt me more.'—III., iv., 25.
(Objective) 'The thing ∧ she begs.'—I., iv., 247.
'Two ∧ she loved and hated.'—V., iii., 281.

Relative Pronoun disagreeing in Person with its Verb—

'We first address towards *you*, *who* with this king,
Hath rivalled for our daughter.'—I., i., 193-194

What = whatever—

'*What* will hap more to-night, safe scape the king.'—III., vi., 121.

= whoever—

'*What* in the world he is
That names me traitor, villain, like he lies.'—V., iii., 97, 98.

See also V., iii., 125.

Who not = everybody—

'He that dares approach
On him, on you, ∧ *who not?*'—V., iii., 100

Compare our modern use of *what not* = everything.

That, etc.—As regards the Shakesperian use, the following rules will generally hold good—

(1) *That* is used as a Relative (*a*) after a Noun preceded by the article, (*b*) after nouns used vocatively, in order to complete the description of the antecedent by adding some essential characteristic of it.

(2) *Who* is used (*a*) as the relative to introduce a fact about the antecedent. It may often be replaced, by '*and he*,' '*for he*,' *though he*,' etc.

(*b*) It is especially used after antecedents that are lifeless or irrational in order to give force to personification.

(3) *Which* is used (*a*) in instances where the relative clause varies between an essential characteristic and an accidental fact, especially where the antecedent is preceded by *that*; (*b*) where the antecedent is repeated in the relative clause; (*c*) in the form '*the which*' where attention is especially called to the antecedent; (*d*) where *which* is collective meaning '*a circumstance which.*'

'Poor Tom, *that* eats the swimming frog,' etc.—III., iv., 134–139.

Study also III., vii., 89, 90; IV., ii., 51–53; IV., iii., 16.

Note—

'To send the old and miserable king
To some retention and appointed guard,
Whose [= for his] age has charms in it.'—V., iii., 48.
'Servants, *who* [= and they] seem no less,
Which [= such as] are to France the spies.—III., i., 24.
'It is a chance *which* does redeem all sorrows
That I have ever felt.'—V., iii., 266.

'*Who*' = whom—

'*Who* would'st thou serve?'—I., iv., 26.
'*Who*, I'll intreat to lead me.'—IV., i., 47.
'*Who*, hath he left behind him.'—IV., iii., 8.

That as—

Modern usage only allows *that which, such as*

'With *that* ceremonious affection *as* you were wont.'—I., iv., 63.

Such . . . that = such as—

'Sure her offence
Must be of *such* unnatural degree,
That monsters it.'—I., i., 223.

Omission of so, as—

'Fool me not so much
∧ To bear it tamely.'—II., iv., 279.

See also I., iv., 40., and III., i., 35, 36.

That = because—

'Only she comes too short, *that* I profess
Myself an enemy to all other joys.'—I., i., 74.

Redundant '*that*'—

'Since *that* respects of fortune are his love.'—I., i., 251.

See also II., i., 47, and IV., vi., 219.

Verb from Adjective—

'Not bolds the king.'—V., i., 26.

Verb from Noun—

'Stocking his messenger.'—II., ii., 139.

See also III., v., 40; III., iii., 14; III., vi., 105; III., vii., 45; V., i., 26, and V., iii., 262.

Intransitive Verb rendered causatively Transitive—

'*Squints* the eye and makes the harelip.'—III., iv., 122.

Participial forms from adjectives and nouns:

A participle formed from an adjective = '*made (the adjective)*,' but formed from a noun, means, as a general rule, '*endowed with (the noun).*'

'He *childed* as I *fathered*.'—III., vi., 117.
'Make thy words *faithed*.'—II., i., 72.

See also I., i., 207; IV., v., 13; IV., vi., 284.

(To be continued.)

IV. THE NEW CABINET.

First Lord of Treasury and Lord Privy Seal	Mr. Gladstone.
Lord Chancellor	Lord Herschell.
Secretary of State for India and Lord President of the Council	Earl of Kimberley.
Secretary of State for Foreign Affairs	Earl of Rosebery.
Secretary of State for the Colonies ..	Marquis of Ripon.
Secretary of State for the Home Department	Mr. Asquith, Q.C.
Secretary of State for War	Mr. Campbell-Bannerman.
First Lord of the Admiralty	Earl Spencer.
Chancellor of the Exchequer ..	Sir W. V. Harcourt.
Chief Secretary to the Lord Lieutenant of Ireland..	Mr. J. Morley.
Secretary for Scotland	Sir G. Trevelyan.
President of the Board of Trade ..	Mr. Mundella.
President of the Local Government Board	Mr. H. H. Fowler.
Postmaster-General	Mr. Arnold Morley.
Vice-President of the Committee of Council on Education	Mr. Arthur Acland.
Chancellor of the Duchy of Lancaster	Mr. Bryce.
First Commissioner of Works ..	Mr. Shaw-Lefevre.

V. UGANDA.

This country has a good title to Uganda, as far as things African go. It was first reached by two British officers, Captains Speke and Grant, in 1861, and their enforced detention at King M'tesa's court enabled them to bring home details for us concerning a race of people very different from ordinary Africans. M'tesa himself evinced a strong desire to be brought into closer relationship with a nation which, judged by the specimens then visiting him, must be well worth knowing.

Thus things went on for a time, and in 1874 an officer from General Gordon again revived the king's interest in our countrymen. At last Mr. Stanley reached the king of the Baganda, and once more carefully took the measure of his inclinations. The result was that on the 30th June, 1877, a first instalment of teachers from the Church Missionary Society reached the capital of the country, and began a work which, despite all obstacles and dangers, has never since ceased.

On the 21st of February, 1879—that is, twenty months afterwards—the Romanists entered upon the scene, represented by Père Loudel and his party. From that very moment trouble began. There were then two bands of men, full of enthusiasm yet diametrically opposed to each other, and there was a climate in which exhaustion frequently removes the governor of common sense from the cerebral system of the white man, and so there was a whizz and whirr and flutter of nerves and brains and sentiments and—general mischief everywhere.

In this special instance there was an astounded horde of savages, a disappointed, a disillusioned tyrant, and—we need not further descant upon the trouble in Uganda.

VI. THE IRISH CENSUS.

The population, including the military, was 4,705,000. In 1881 it was 5,175,000, giving therefore in ten years a decrease of 470,000, or 9 per cent. The Scotch in Ireland increased 22·5 per cent., and the Romanists decreased 10·5 per cent. In 1881, 41 per cent. were not able to read and write, but in 1891 there was only 31 per cent. thus situated. The emigration during the ten years amounted to 768,000 persons, or nearly 200,000 more than the decrease.

Species of Land.	1881.	1891.
	Acres.	Acres.
Under Crops	5,195,377	4,818,381
Under Grass	10,075,425	10,298,654
Under Woods	328,703	311,544
Non-Productive	4,595,097	4,769,677

Animals.	1881.	1891.
Horses and mules	574,745	621,479
Asses	187,143	216,268
Cattle	3,956,595	4,448,516
Sheep	3,256,185	4,722,613
Pigs	1,095,830	1,367,712
Goats	266,078	336,337
Poultry	13,972,426	15,276,128

These figures form a striking proof of the increasing prosperity of the people of Ireland, for while the population has decreased 9 per cent., the live stock, *in every particular*, has vastly increased.

In 1891 14 per cent. only could speak Irish as against 17 per cent. in 1881. The number of paupers in the workhouses has also decreased 24 per cent., and the number in receipt of parish relief 2 per cent.

VII. Mental Arithmetic Paper.

(*Twenty minutes allowed for this paper.*)

1. Take 1,754 from 5,000 =
2. $(17 \times 11) - (18 \times 6)$ =
3. 1760×25 =
4. How many pieces measuring $2\frac{1}{4}$ inches can be cut from 90 yards? =
5. 375×999 =
6. Add $\frac{3}{16}$ of £ to $\frac{7}{16}$ of £5 =
7. What is the rent for 5 weeks at £260 per annum? =
8. How many feet are there in a mile and half? =
9. Divide $\frac{1}{4} \times 2\frac{1}{2}$ by $\frac{1}{8}$ of 1·4 =
10. Reduce to decimals of £1 these sums—(*a*) 1s. 6d., (*b*) £14 17s., (*c*) £5 3s. 6d. =
11. Reduce to ordinary money the following decimal expressions—(*a*) £·075, (*b*) £11·625 (*c*) £3·95 =
12. If books are published at £18 15s., what is the selling price at a reduction of 25 per cent.? =
13. Find L.C.M. of 36, 20, 8, 12. =
14. Find total of 1s. 6d. per day for five years =
15. What is the actual rate of interest on 3 per cent. Consols bought at 75? =

Answers.

1. 3,246.
2. 79.
3. 44,000.
4. 1,440.
5. 374,625.
6. £3 4s. 7d.
7. £25.
8. 7,920.
9. $1\frac{1}{4}$.
10. (*a*) ·075, (*b*) 14·85, (*c*) 5·175.
11. (*a*) 1s. 6d., (*b*) £11 12s. 6d., (*c*) £3 19s.
12. £14 1s. 3d.
13. 360.
14. £136 17s. 6d.
15. 4 per cent.

VIII. A crew can row a certain course *up* stream in 84 minutes; if there were no stream, they could *row* the same course in 7 minutes less than it takes them to *drift* down with the stream. How long would they take to row *down* with the stream?

Let d = distance of course.
Let r = rate of rowing.
Let s = rate of stream.

Now because time = distance by rate, and the rate of rowing up stream is evidently $(r - s)$ $\therefore \frac{d}{r-s} = 84$. [Equation I.]

Again $\frac{d}{s}$ = time taken to drift down, and

$\frac{d}{r}$ = time taken to row down.

$\therefore \frac{d}{s} - \frac{d}{r} = 7 = \frac{d(r-s)}{sr}$. [Equation II.]

$\therefore \frac{d}{r-s} \div \frac{d(r-s)}{sr} = \frac{84}{7}$. [Dividing I. by II.]

$\therefore \frac{d}{(r-s)} \times \frac{sr}{d(r-s)} = 12.$

$\therefore \frac{sr}{(r-s)^2} = 12.$

$\therefore \frac{4sr}{(r-s)^2} = \frac{48}{1}$.

$\therefore \frac{(r+s)^2}{(r-s)^2} = \frac{49}{1}$. [By adding 1 to each side.]

$\therefore \frac{r+s}{r-s} = \frac{7}{1}$.

$\therefore r + s = 7r - 7s$

$\therefore 6r = 8s$

$\therefore s = \frac{3}{4}r$

But $r + s$ = speed of rowing down stream, and the times are inversely proportional to the speeds. $\therefore$ If it takes 84 mins. when the speed is $r - s$, what will it take when the speed is $r + s$?

$\therefore$ As $(r + s) : (r - s) :: 84 \text{ mins.} : x$

but $s = \frac{3}{4}r$, $\therefore$ as $\frac{7}{4}r : \frac{1}{4}r :: 84 \text{ mins.} : x$

$\therefore$ as $7 : 1 :: 84 \text{ mins.} : x$

$\therefore$ 12 mins. = Ans.

SELECTED GOVERNMENT QUESTIONS.

FIRST YEAR.

Second Week of Month.

1. Write in large hand the words '*Characteristically feeble.*'
Write in small hand the words '*Some pious drops the closing eye requires.*'

2. Write from Dictation:—

'I deny not but that it is of greatest concernment in the Church and Commonwealth to have a vigilant eye how books demean themselves as well as men, and thereafter to confine, imprison, and do sharpest justice on them as malefactors; for books are not absolutely dead things, but do contain a progeny of life in them, to be as active as that soul was whose progeny they are; nay, they do preserve, as in a vial, the purest efficacy and extraction of that living intellect that bred them.'—*Milton.*

3. What is meant by '*Mental Suggestion*' or the '*Association of Ideas*'? Give some examples, and show in what sort of school lessons the principle of *Association* is of most importance, or is best illustrated.

4. The New Code attaches special and increased importance to the study of Drawing in schools. Describe some of the earliest exercises which should be given in Drawing, and say in what relation they stand to a good and complete course of general education.

5. Write the following passage in the Treble Clef to sound two octaves higher.

What tones of the common major scale are a major third and a perfect fifth apart?

6. Arrange the sharps or flats of the following signatures in the customary order, and state for what major keys they stand:—

What circumstances tend to modify the mental effects of scale tones?

7. Write a short essay on a man's character as shown in his behaviour to other men.

8. (*Men only.*) Parse the words in italics in the following passage, and give rules for parsing in each case:—

'*Yet* was his hazard *small; for* well
You may *bethink you* of the spell
Of that sly urchin page;
This to his lord he did impart,
And made him *seem*, by glamour art,
A *knight* from Hermitage.
Unchallenged thus, the warder's *post*,
The court, unchallenged, thus he crossed,
For all the vassalage,
But O! what magic's quaint disguise
Could blind fair Margaret's azure eyes!'

Also analyse the first six lines.

(*Women only.*) Analyse the following passage and parse the words in italics:—

'Earth fills her lap with pleasures of her *own*;
Yearnings she hath in her own natural kind,
And *even* with something of a *Mother's* mind
And *no* unworthy *aim*.
The homely Nurse *doth* all she *can*
To make her Foster-child her Inmate *Man*
Forget the glories he *hath known*
And *that* imperial *palace whence* he came.'

9. What principal causes regulate the distribution of rain? Give instances of phenomenal abundance or scarcity.

10. (*Men only.*) Draw a map of Hindostan, noting only the spots famous for great events.

(*Women only.*) Draw a map of the lake region of Africa.

11. What were the chief causes of dispute between Henry II. and Becket, John and the Pope, Edward I. and the Clergy?

12. (*Men only.*) Both the Royalist and Parliamentary parties suffered from internal dissensions. Give some account of these, and say what causes contributed to the final triumph of the Parliament.

(*Women only.*) Give a sketch of the growth of our Indian Empire after the rule of Clive.

13. Define a Decimal Fraction; contrast it with a Vulgar Fraction; and show how the latter can be converted into the former. Can all Vulgar Fractions be so converted, and if not, why?

14. (*Men only.*) What sum of money will amount to £154 7s. in 3 years at 5 per cent. compound interest?

Ans. £133 6s. 8d.

(*Women only.*) If 3 gallons of water be mixed with 18 gallons of spirit, by how much per cent. is the value of a gallon of the mixture depreciated? Ans. 14⅔ per cent.

15. (*Men only.*) A park has the shape of a regular octagon, the

side of which is 23·75 chains, and the perpendicular from the centre to the side 28·25 chains. Find the area in acres, etc.

Ans. 268 acres 1 rood 20 poles.

(*Women only.*) Write out instructions as to the cutting-out and making a shirt for a child 2 years of age. Name the amount of material required, together with the width and price of the same.

16. (*Men only.*) What is the radius of that circle in which a sector of 75° contains 120 square feet? Ans. $24 \div \sqrt{\pi}$

(*Women only.*) What are the component gaseous elements in water, and in what proportions are they combined?

17. (*Men only.*) Multiply $a^{\frac{5}{2}} - a^3 + a^{\frac{9}{2}} - a^2 + a^{\frac{3}{2}} - a + a^{\frac{1}{2}} - 1$ by $a^{\frac{1}{2}} + 1$. Ans. $a^4 - 1$.

(*Women only.*) What are the chief processes through which food passes in the process of digestion? Why is bread unsuitable for very young infants?

18. (*Men only.*) Extract the square root of $16 + 5\sqrt{7}$.

Ans. $\sqrt{\frac{35}{2}} + \sqrt{\frac{5}{2}}$.

(*Women only.*) Show the necessary weekly expense in an agricultural district of a labourer's household, consisting of himself, wife, and 3 children under 7 years of age.

19. (*Men only.*) Write out Euclid I. 36.

Equal parallelograms between the same parallels are on equal bases.

(*Women only.*) If the 6d. loaf weighs 3 lb. 5½ oz. when wheat is at 6s. per bushel, what should it weigh when wheat is at 5s. per bushel? Ans. 4 lb.

20. (*Men only.*) Write out Euclid III. 32.

If P be the middle point of the arc A B, prove that the tangent at P is parallel to the chord A B.

FOURTH WEEK OF MONTH.

1. Write in large hand the words '*Absolutely inevitable.*'

Write in small hand the words, '*England expects every man to do his duty.*'

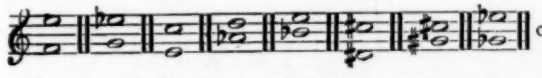
2. Write from Dictation :—

'He made an administration so chequered and speckled; he put together a piece of joinery so crossly indented and whimsically dovetailed; a cabinet so variously inlaid; such a piece of diversified mosaic; such a tessellated pavement without cement, here a bit of black stone, and there a bit of white; patriots and courtiers; King's friends and republicans, treacherous friends and open enemies; that it was indeed a very curious show, but utterly unsafe to touch, and unsure to stand on.'—*Burke.*

3. Describe what appear to you to be the wisest and most effectual ways of dealing with disobedience or other misconduct (*a*) in an infant school, or (*b*) in a school for older children.

4. What is the use of '*Paraphrase*' as an exercise in Language? Give, as to a Pupil Teacher, some rules which should be observed in attempting to paraphrase a poetical extract, and add a *brief* example of a good paraphrase of your own, of some familiar verse of four lines.

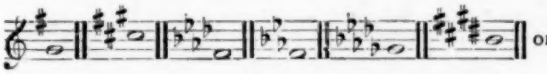
5. State the names (as major third, etc.) of the following intervals :—



Name (as major sixth, etc.) the following intervals :—

1 f — m'	(5) ta_1 — m
(2) m — d	(6) t_1 — l
(3) t_1 — s	(7) t_1 — m
(4) f — t	(8) fe — re'

6. State the major key relation (as tonic, mediant, etc.) of the following notes :—



Re-arrange the following notes in order of pitch, placing the lowest notes first in each case :—

(*a*) s d' f_1 m r fe_1 d s' r' ta_1 t_1

(*b*) r d' s d s_1 r' l_1 m_1 la_1 f_1 fe_1 t_1

7. Explain the terms Simple, Compound, Complex as applied to sentences, and analyse

'When in Salamanca's cave,
Him listed his magic wand to wave,
The bells would ring in Notre Dame!'

8. (*Men only.*) Reproduce, in your own words, the substance of Bacon's Essay on *Atheism* or *Superstition.*

(*Women only.*) Summarise Burke's remarks upon '*The right to form a government for ourselves.*'

9. What is meant by the '*Equatorial Current?*' Explain the difference between tides and tidal currents.

10. (*Men only.*) Describe the physical features, climate, and vegetable productions of Ceylon, or of New Zealand.

(*Women only.*) Give an account of the Sultanate of Zanzibar, especially of the relations of Zanzibar with Asia and Europe.

11. Give the dates of deaths of Canute, Robert of Gloucester, Simon de Montfort, and John Hampden. For what events were the years 1305, 1376, 1413, 1499 noted?

12. (*Men only.*) Give in outline the history of the Long Parliament.

(*Women only.*) Explain clearly the Reform of the Calendar in 1751.

13. If 3 men with 4 boys earn £5 16s. in 8 days, and 2 men with 3 boys earn £4 in the same time, in what time will 6 men and 7 boys earn 20 guineas? Ans. 15 days.

14. (*Men only.*) Find to three decimal places the cube root of 267. Ans. 6·439.

(*Women only.*) If 5 men and 7 boys can reap a field of corn of 125 acres in 15 days, in how many days will 10 men and 3 boys reap a field of corn of 75 acres, each boy's work being half that of a man?

Ans. $6\frac{13}{18}$ days.

15. (*Men only.*) Given that the difference of the two altitudes of two similar triangles is 3 ft., the difference of their areas 30 sq. ft., and that of their bases 4 ft., find the altitude of the smaller triangle.

Ans. 6 ft.

(*Women only.*) Reckoning 45 children in Standard I., 20 in Standard II., 15 in Standard III., 10 in Standard IV., and 5 each in Standards V. and VI., how would you spend £5 on needlework materials?

16. (*Men only.*) A circle of 10 inch radius is divided into three equal parts by concentric circles. Find the length of their radii.

Ans. 5·74 and 8·163 inches approximately.

(*Women only.*) What is the ordinary temperature of the human body in health, and how can it best be kept uniform?

17. (*Men only.*) Solve—

(*a*) $x + \sqrt{5x + 10} = 8$. Ans. 18 or 3.

(*b*) $x^2 - 7x + \sqrt{(x^2 - 7x + 18)} = 24$. Ans. 9 or −2.

(*Women only.*) Into what classes may food be divided? Name them, describing their chief qualities.

Classify the following :—Cheese, fruit, brown bread, milk, oatmeal, mutton, sugar, salt, potatoes.

18. (*Men only.*)—

$$\left.\begin{aligned} \frac{x+y}{x-y} + \frac{x-y}{x+y} &= \frac{10}{3} \\ x^2 + y^2 &= 45 \end{aligned}\right\} \quad \text{Ans. } x = \pm 6,\ y = \pm 3.$$

(*Women only.*) Write out some good recipes for an Irish stew, a light pudding, and for cooking a mutton chop and a poached egg.

19. (*Men only.*) Write out Euclid II. 4—

From the hypothenuse of a right-angled triangle portions are cut off equal to the adjacent sides; prove that the square on the middle segment is equal to twice the rectangle contained by the extreme segments.

(*Women only.*) Find the cost of 9 silver spoons, each weighing 2 lbs. 11 ozs. 13 dwts., at £3 6s. 11d. per lb.

Ans. £89 0s. $2\frac{7}{10}$d.

20. (*Men only.*) Write out Euclid III. 34—

Through a given point outside a given circle draw a straight line which shall intercept a segment containing a given angle.

SECOND YEAR.

SECOND WEEK OF MONTH.

1. As in First Year.

2. As in First Year.

3. Illustrate the statement that in all discoveries of natural science the processes of induction and deduction follow each other before a complete verification of a law can be obtained.

4. (*a*) A school has been open for 440 attendances in the year; 35,047 attendances have been made. Find the annual average.

(*b*) Write out the rules to be observed in marking the daily attendance register in case of—

(1) Absence; (2) A scholar leaving before the two hours' secular instruction has expired; (3) Days being set apart for special inspection.

CERTIFICATE ROUTINE FOR **SEPTEMBER**, 1892 (MEN AND WOMEN, SECOND YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	Formation of Habits and Character	Analyse (and Parse difficult words of) Lines 542 to 553 of Canto VI. of 'Lay of Last Minstrel,' *or* Lines 1 to 9 of Scene 1, Act IV. of 'King Lear'	Euclid, Book III., Props. 24 to 32, *or* Whipping and Feather-Stitching	Spencer *or* Locke	Composition upon 'Habits and Character'	Euclid, Book III., Props. 32 to 37, *or* Write down directions for Making a Child's Muslin Pinafore	Form 'VIII. M.' and the salient points of the Code	Analyse (and Parse difficult words) from Bacon's 50th Essay *or* Lines 11 to 20 of Scene 4, Act IV., 'King Lear'	Deductions upon Euclid, Book II., *or* Darning with Stocking-web Stitch	Spencer *or* Locke	Composition upon 'Where there's a will, there's a way'	Euclid, Book III. *or* Cutting out on Paper a Boy's Shirt and a Child's Pinafore
TUESDAY	Scotch Affairs from 1789 to 1820	Square Root	As in First Year, *or* Political Geography of Canada	Dates from 1066 to 1478, *or* from 1789 to 1802	Division into Proportional Parts	As in First Year, *or* Political Geography of Canada	Lives of Great Men from 1789 to 1820	Percentages	As in First Year *or* Climate, Productions, Commerce of United States	Dates from 1688 to 1789, *or* Wars with Spain and Holland from 1789 to 1820	Theory of Proportion	As in First Year, *or* Physical Geography of United States
WEDNESDAY	Any Revision	Binomial Theorem *or* Antidotes of Common Poisons	School Premises	Permutations and Combinations, *or* How to treat Burns, Scalds, Dog-bites, Nose-bleeding, and Fainting	Any Revision	Paraphrase Lines 284 to 293 of 'Lay of Last Minstrel,' Canto V. *or* Lines 1 to 13 of Scene 7, Act III., of 'King Lear'	Binomial Theorem *or* Qualities and Training of a Maid-servant	Mental Arithmetic	Binomial Theorem *or* Puddings	Any Revision	Theory of Quadratics *or* Infection and Contagion	As in First Year, *or* Political Geography of United States
THURSDAY	Irish Affairs from 1789 to 1820	Problems on G.C.M. and L.C.M.	As in First Year, *or* Map of N. W. Territories	History from 1789 to 1802	Chain Rule, *or* School Cookery Classes	As in First Year, *or* Geography of Western United States	Dates from 1478 to 1688, *or* History from 1802 to 1815	Miscellaneous Arithmetical Problems	As in First Year, *or* Map of British Columbia and Vancouver's Island	History from 1808 to 1815	Alligation	As in First Year, *or* Geography of Mexico
FRIDAY	Logarithms *or* Disinfectants	Deductions on Euclid, Book I., *or* Diagram of a Woman's Night-dress	Study Trench, Lecture IV., *or* Bacon's Essays, 11, 14, 16, and 18	Ratio and Proportion, *or* Revise the Composition of Food	Euclid, Book IV., Props. 1 to 8, *or* Diagram of a Boy's Shirt	Study 'Lay of Last Minstrel' *or* Bacon's Essays, 19, 21, 24, 25, and 26	Difficult Quadratics *or* Choice and Cooking of Fish	Euclid, Book IV., Props. 9 to 16, *or* Making of a Child's Muslin Pinafore	Paraphrase Lines 492 to 501 of Canto IV. of 'Lay of Last Minstrel,' *or* Lines 9 to 22 of Scene 1, Act IV., 'King Lear'	Theory of Involution and Evolution, *or* Pig and Poultry Keeping	Deductions upon Euclid, Book II., *or* Making of a Boy's Shirt	Study 'King Lear'
SATURDAY	Notes of a Lesson on Simple Practice, *or* Upon 'White and Black' for Infants	Repetition, Penmanship, etc.	Music—Compass and Registers of Voices	Examination	Classification of Scholars and Home Lessons	Repetition, Penmanship, etc.	Music—Training of the Voice	Examination	Notes of a Lesson on 'Volcanoes' *or* 'The Bee,' for Infants	Repetition, Penmanship, etc.	Music—The Simple Times *or* All the Measures in common use	Examination	Organisation of Half-Time and Mixed Schools	Repetition, Penmanship, etc.	Music—Major and Minor Scales *or* Major and Minor Modes	Examination

CERTIFICATE ROUTINE FOR **SEPTEMBER, 1892** (MEN AND WOMEN, FIRST YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	The Nature and Maintenance of Discipline	Read Bacon's Essays, 17, 18, 19, 21, 24, 25, 27, 28, *or* 'Burke's Reflections,' pp. 183 to 217	Euclid, Book III., Props. 24 to 32, *or* Repairing Underclothing	Notes of a Grammar Lesson to Standard V *or* on 'Form'	Language of Bacon *or* 'Burke's Reflections' pages 217 to 255	Euclid, Book III., Props. 32 to 37, *or* Diagram of an Infant's Shirt	The General Principles of Teaching	Analyse Lines 21 to 28 of 'Resolution and Independence,' and Parse difficult words, *or* 'Lay of Last Minstrel,' Canto V., Lines 310 to 316	Euclid, Book III., Props. 1 to 8, *or* Any Needlework	The Cultivation of the Intelligence	Analyse and Parse from Essay XV., *or* Lines 49 to 57 of 'Tintern Abbey'	Euclid, Book I., Props. 27 to 48, *or* Questions on Needlework
TUESDAY	Chief Dates from 1066 to 1307	Arithmetical Problems, *or* Mental Arithmetic	British Possessions in Africa	Chief Dates from 1307 to 1478	Mental Arithmetic	Geography of Eastern Africa	The Great Rebellion	Mensuration of the Circle, *or* Compound Proportion	Effect of Climate upon Industry, Production, and National Character	Chief Dates from 1478 to 1624	Proofs of the formulæ of the Progressions, *or* Ventilation	Recent African Exploration
WEDNESDAY	Algebraic Proofs of G.C.M. and L.C.M., *or* Construction of the House	History from 1066 to 1307	Corporeal Exercises at School	Simultaneous Equations of one degree, *or* Furnishing of the House	Clock Sums *or* Mixed Fractions	Study Grammar from Text-book	Simultaneous Quadratics, *or* Cleanliness of the Home	General Arithmetical Problems	Euclid, Book I., Prop. 1. to 26, *or* Cutting-out of a Woman's Chemise	Geometrical and Harmonical Progressions *or* Respiration	Compound Proportion	Any Revision
THURSDAY	History from 1603 to 1625, *or* Revision	Mensuration of Parallelograms *or* Compound Practice	Map of British South Africa	History from 1307 to 1478	Proofs of Propositions in Ratio and Proportion, *or* Warming and Lighting of the Home	Causes which affect Climate	History from 1478 to 1624	Problems on Simultaneous Quadratics, *or* Uses of Air	Map of Egypt	History from 1625 to 1642, *or* Revision	Mental Arithmetic	Distribution of Plants and Animals
FRIDAY	Any Revision	Deductions of Euclid, Book I., *or* Diagram of a Woman's Chemise	Parse and Analyse from Essay I., *or* Lines 1 to 9 of 'Intimations of Immortality'	Most Important Laws of the Period	Deductions of Euclid, Book II., *or* Cutting-out of an Infant's Shirt	Style of Wordsworth	Any Revision	Deductions of Euclid, Book III., *or* Any Needlework	Describe any Excursion which you have made to any Historical Spot	Theory of Quadratic Equations and Repeating Decimals, *or* Organs of Respiration	Any Revision	Pick out the Archaic Words of Bacon or Wordsworth
SATURDAY	The Inter-relationship of the Mental Faculties	Repetition, Penmanship, etc.	Music—the Tonic, Sub-Dominant, Dominant, etc.	Examination	Revise any School Management	Repetition, Penmanship, etc.	Music—Transposition *or* Octave Marks, Standard Pitch, and Key-Relationships	Examination	How to Teach Geography *or* 'Colour'	Repetition, Penmanship, etc.	Music—Value of Notes and Rests, *or* Pulses and Accents	Examination	Training of the Memory	Repetition, Penmanship, etc.	Music—Signature of the *Simple* Times, *or* Two, Three, and Four Pulse Measures	Examination

5. As in First Year.

6. Write the ascending scale of A minor, C minor, and E♭ minor, using the major sixth and the major seventh.

Place the sharps and flats before the notes as necessary, and not as a signature. OR,

What tones in the relative major correspond to the following passage in the minor key?

m t, d m d se, l, f r m ba se l m f m l,

7. Write a short essay on *Adversity*, or '*Language is ever in flux and flow.*'

8. Paraphrase the following, and parse the words in italic—

'To thee and thine hereditary ever
Remain this ample *third* of our fair kingdom;
No *less* in space, validity and pleasure,
Than that conferred on Goneril.—Now, our *joy*,
Although the last, not least; to *whose* young love
The vines of France and milk of Burgundy
Strive to be interessed; *what* can you *say to draw*
A third more *opulent than* your *sisters?* *Speak.*'

9. (*Men only.*) As in First Year.

(*Women only.*) Draw a sketch map of the Provinces of Quebec and Ontario, showing only the principal towns, and the communication between them by lake, river, canal, and railway.

10. (*Men only.*) As in First Year.

(*Women only.*) Describe a journey across the Continent by the Canadian Pacific Railway.

11. (*Men only.*) As in First Year.

(*Women only.*) Give the dates of Mutiny at the Nore, Capture of Malta, Battles of Argaum, Salamanca, Orthes, and New Orleans. What are the years 1794, 1799, 1805, 1809, and 1812 noted for?

12. (*Men only.*) As in First Year.

(*Women only.*) What effect had the French Revolution on (*a*) the leading English statesmen of that time, (*b*) the middle classes, and (*c*) the artisan class.

13. As in First Year.

14. As for First Year (Men).

15. (*Men only.*) As in First Year.

(*Women only.*) Cut out in paper the left half of a woman's night-dress.

16. (*Men only.*) Find the weight of water contained in a cylindrical boiler, the radius of whose base is 2¼ feet, and height 10 feet, reckoning a cubic foot of water to weight 62½ lbs.

Ans. $5\frac{4995}{11551}$ tons.

(*Women only.*) With what plans are you acquainted for encouraging school children to save? Which do you consider the best, and how should it be worked?

17. (*Men only.*) Prove that the number of combinations of n things taken r at a time is the same as the number of them taken $n-r$ at a time.

How many different permutations may be made of the letters in the word *Barabbas?* Ans. 1120.

(*Women only.*) What foods do you consider most suitable for (*a*) Young children, (*b*) Working-men, and (*c*) Invalids? Give reasons for your answer.

18. (*Men only.*) How many words of 6 letters can be formed with 3 vowels and 3 consonants, the vowels always having the even places? Ans. 36.

(*Women only.*) Write down as in a bill the annual cost of clothing 12 girls about 13 years old. State the different materials required and their quantity.

19. (*Men only.*) As in First Year.

(*Women only.*) The difference in the income arising from investing a certain sum in the Three per Cents. at 92, or in the Three-and-a-Half per Cents. at 107½, is 10d. Find the sum.

Ans. £1644 10s.

20. (*Men only.*) Write out Euclid IV. 5.

What is the *nine-points circle?* Draw it.

SECOND YEAR.

FOURTH WEEK OF MONTH.

1. As in First Year.

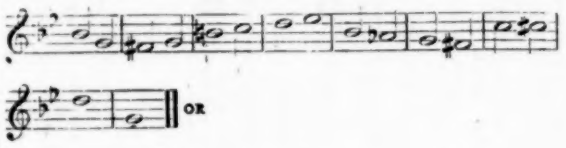
2. As in First Year.

3. Show how the formation of a habit of truthfulness may be materially assisted by a teacher in the conduct of his class.

4. How may the noxious products of combustion of gas-burners be most effectually removed from a schoolroom? Explain some system of gas-burners which produce effectual combustion without vitiating the atmosphere of a schoolroom.

5. As in First Year.

6. Transpose the following a major second lower, *i.e.*, from G minor to F minor:—



Write the names of the following notes:—

(*a*) *fah* sharp in the minor; (*d*) *lah* sharp;
(*b*) *ray* sharp; (*e*) *te* flat;
(*c*) *me* sharp; (*f*) *me* flat.

7. Analyse the following passage:—

Since thou hast sought to make us break our vow,
Which we durst never yet; and with strained pride
To come between our sentence and our power,
Which nor our nature nor our place can bear,
Our potency made good, take thy reward.
Five days we do allot thee, for provision
To shield thee from diseases of the world,
And on the sixth to turn thy hated back
Upon our kingdom.

8. Write such grammatical notes as seem needful to you on the following passages:—

(*a*) 'Be Kent unmannerly when Lear is mad.'

(*b*) 'Therefore beseech you to turn your liking a more worthier way.'

(*c*) 'I know you what you are.'

(*d*) 'I would breed from hence occasions.'

(*e*) 'Lend less than thou owest."

9. (*Men only.*) As in First Year.

(*Women only.*) To what extent have (*a*) France, (*b*) Spain and Portugal, (*c*) Holland, left their mark on the North American continent in (i.) nomenclature, in (ii.) character.

10. (*Men only.*) As in First Year.

(*Women only.*) Describe the political constitution of the Dominion of Canada. In what material points does it differ from that of the United States?

11. (*Men only.*) As in First Year.

(*Women only.*) Give a short account of the rise and progressive influence of the Newspaper Press.

12. (*Men only.*) As in First Year.

(*Women only.*) Name the leading poets who lived and wrote at the end of the 18th and beginning of the 19th century, and the most important works of each. Give your own estimate of any one great poem produced during this period.

13. A merchant sold a horse at a loss of 4 per cent. Had he sold it for 4 guineas more he would have gained 5 per cent. Find the original cost. Ans. £46¾.

14. As for First Year (Men).

15. (*Men only.*) As in First Year.

(*Women only.*) Give the details of the dimensions of a shirt for a boy 13 years of age.

16. (*Men only.*) How many square inches of gold leaf will gild a globe 18 ins. in diameter? Ans. 1,018¼ sq. ins.

(*Women only.*) Mention the chief defects observable in the homes of the poorer classes in providing wholesome and suitable meals.

17. (*Men only.*) In the expansion of $(1+x)^n$, the coefficient of the r^{th} term from the beginning is equal to the coefficient of the r^{th} term from the end. Prove this.

Write down the coefficient of y in the expansion of $\left(y^2+\frac{c^3}{y}\right)^5$.

Ans. $10c^9$.

(*Women only.*) What instruction have you received in cooking? Describe the cooking utensils which a school teacher should possess in her own school-house, and the use to which these should be applied.

18. (*Men only.*) In the common system of logarithms, if the logarithm of any number be known, we can immediately determine the logarithm of its product or quotient by any power of 10. Prove this.

Given Log. 2, find Log. $\sqrt{(1.25)}$.

Ans.—½ (Log. 10 — 3 Log. 2).

(*Women only.*) State briefly any difference which should be made in washing coloured flannel, coloured print, and brown holland frocks. Name the materials required in a laundry for washing the above articles, and for washing and getting-up collars, cuffs, and pocket-handkerchiefs.

19. (*Men only.*) Write out Euclid VI. 4.
Give the six principal definitions of the Fifth Book.
(*Women only.*) A boat's crew rowed 4 miles in 20 minutes *against* a stream flowing 1 mile in 20 minutes. How long will it take them to row 5 miles *with* the stream? Ans.—20 minutes.

20. (*Men only.*) As in First Year.

CORRESPONDENCE.

We shall be pleased to reply briefly and through these columns to anyone seeking examinational information and advice.
This privilege does not, of course, extend to furnishing the solutions and answers of problems. All such communications should be addressed to 'THE QUERY EDITOR.'
Replies demanding urgency will be promptly forwarded per post on receipt of a stamped and addressed envelope. A post will be saved by writing direct to DR. GEORGE BEACH, M.A. (*Examination Editor of 'Practical Teacher'*), STANLEY MOUNT, MACCLESFIELD.

C. O. (Banbury).—You are not compelled to sit at Christmas although you have taken the Recitation.

'J. AT.' (Aldershot), Q. S. C. (Leominster), C. M. (Plymouth), W. C. (Wick).—The errors are acknowledged in our article. Please accept our best thanks.

H. C. (Tadcaster).—From Science and Art Department, South Kensington.

A. C. K. (Boston).—The mistake has been corrected in the second edition.

H. L. (Saltley).—According to the Syllabus, the University Examination must be passed during the career at the Training College.

W. F. F. (Audley).—We make an exception in your case.

The train which leaves London at 2.50 p.m. arrives at Leeds at 7.10 p.m.; and the train leaving Leeds at 2.30 p.m. arrives at London at 7.50 p.m. At what time should they pass each other?

A First train goes in 4 hrs. 20 min. = 260 min.
B Return train goes in 5 hrs. 20 min. = 320 min.
Return train starts 20 min. first and does $\frac{20}{320} = \frac{1}{16}$ (leaving $\frac{15}{16}$) of journey before they run simultaneously.
∴ Ratio of speed of A : B = $\frac{240}{320} = \frac{12}{13}$.
∴ Ratio of speed of A + B : B = $\frac{25}{13}$.
∴ Time required by A + B = time required by B × $\frac{13}{25}$ × $\frac{15}{16}$ × $\frac{8}{3}$ min.
$= \frac{13 \times 15 \times 20}{29}$ min. = $\frac{3900}{29}$ min. = 134 $\frac{14}{29}$ min. after 2.50 p.m. = 4 $\frac{14}{29}$ min. past 5 p.m.

J. B. (Whiston).—Try London Matriculation or the LL.A. of St. Andrews.

STONE (Guildford).—You cannot try 'Blackboard' during your apprenticeship.

T. J. J. (Marylebone) requests (1) 'A cheap and simple recipe for making a *Blackboard Composition* not necessarily for use on ordinary blackboard, but to be applied to calico, millboard, etc., so as to make a black surface suitable for chalk diagrams. (2) The particulars respecting 'any pamphlet containing information about all the examinations open to women, especially Degree Examinations.'

W. W. (Fisherton).—Kindly forward a stamped envelope and we will answer your questions privately. We dare not graduate training colleges in order of merit in these pages.

J. H. (Stamerhead).—We are very glad to hear of your success. Keep in with the powers that be.

3rd Year P. T. (Bridlington).—(1) As in PRACTICAL TEACHER. (2) Get a small card of selected pens from any scholastic stationer, and choose the one you like. This advice is better than any general recommendation.

NEMO.—(Kirton-in-Lindsey).—'Le Directoire,' the Pitt Press edition.

Y. H. (South Shields).—The book is really rom 1760 to 1815, but this is the nearest to the mark.

SAM. (Nottingham).—The Department will mark *twelve* answers.

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M. S. (Bury).—Write to the County Council Organising Secretary.

AB IFOR (Bedwas).—A similar question was set at the recent Queen's Scholarship Examination for Women.

$$\frac{\frac{25}{36} + \frac{1}{6}}{\left(\frac{5}{6} - \frac{1}{2}\right)\left(\frac{5}{6} - \frac{1}{3}\right)} + \frac{\frac{1}{9} + \frac{5}{12}}{\left(\frac{1}{2} + \frac{1}{3}\right)\left(\frac{1}{3} - \frac{5}{6}\right)} + \frac{\frac{1}{4} + \frac{5}{18}}{\left(\frac{1}{2} + \frac{1}{3}\right)\left(\frac{1}{2} - \frac{5}{6}\right)} =$$

$$\frac{\frac{31}{36}}{\frac{1}{3} \times \frac{1}{2}} + \frac{\frac{19}{36}}{\frac{5}{6} \times \left(-\frac{1}{2}\right)} + \frac{\frac{19}{36}}{\frac{5}{6} \times \left(-\frac{1}{3}\right)} =$$

$$\frac{31}{36} \div \frac{1}{6} + \frac{19}{36} \div \left(-\frac{5}{12}\right) + \frac{19}{36} \div \left(-\frac{5}{18}\right) =$$

$$\frac{31}{36} \times \frac{6}{1} + \frac{19}{36} \times \left(-\frac{12}{5}\right) + \frac{19}{36} \times \left(-\frac{18}{5}\right) =$$

$$\frac{31}{6} + \left(-\frac{19}{15}\right) + \left(-\frac{19}{10}\right) =$$

$$\frac{31}{6} - \frac{19}{15} - \frac{19}{10} = \frac{155}{30} - \frac{38}{30} - \frac{57}{30} =$$

$$\frac{155}{30} - \frac{95}{30} = \frac{60}{30} =$$

2 Ans.

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PRIZE ANECDOTE.

The following has been adjudged the best anecdote sent in. A cheque for half-a-guinea has therefore been forwarded to the sender, Mr. Edmund Brooks, National School, Cauldon Lowe, Cheadle, Stoke-on-Trent:—

Test Examination of Standard III. in Geography of the County of Stafford.

Head Teacher.—Name some towns in South Staffordshire?

Boys (individually).—Wolverhampton, Walsall, Bilston, Tipton, Wednesbury, West Bromwich.

Head Teacher.—For what is Walsall noted?

A Boy.—The manufacture of saddlers' ironmongery.

Head Teacher.—Name an article of saddlers' ironmongery.

A Boy.—*Tit-Bits.* (*Tit* is a Staffordshire word for *horse.*)

We again offer a prize of half-a-guinea for the most *amusing* Anecdote connected with school life.

Competitors are requested to note—

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(3) That the judge reserves to himself the right to divide the prize between two or more competitors, and to print any anecdote submitted.
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Anecdote.

PUBLICATIONS REVIEWED.

Short Exercises in Mental Arithmetic: Standards I., II., III.; Standards IV. to VII. London and Edinburgh: W. and R. Chambers, Limited.

In these two small volumes we have a very useful assortment of questions in Mental Arithmetic. Together they contain six thousand questions with answers—three thousand in each volume. Fifty exercises, each consisting of twenty questions of varied form, are given for each standard from the first to the fifth. Standards VI. and VII. have a set of fifty such exercises between them. For time-saving and suggestiveness these books may be strongly recommended. If the exercises were issued separately for each standard without answers they might be used with advantage as class-books for the scholars.

Chambers's School Cookery. By Jane R. Ferguson. London and Edinburgh: W. and R. Chambers, Limited.

This little work is intended as a class-book for the use of girls learning cookery. It contains more than seventy recipes for simple dishes suitable for working-class homes. The directions are very definite, and expressed in the simplest language. A tabulated arrangement of scullery work for a class of twenty-four girls, with general rules for carrying it out, make the book complete and well adapted for its purpose.

Primer of Book-keeping. By J. Thornton.

Easy Exercises in Book-keeping. By the same Author. London: Macmillan and Co.

The chief point that strikes one on examining these little books by Mr. Thornton is that they are eminently practical. But there is more in them to admire. The common-sense views, the short, crisp sentences in which directions are given, the genial manner in which difficulties are explained, the unconventional illustrations bespeak the attention of the learner, and prove the author to be a master of his subject, a teacher full of resource and endowed with the *bonhomie* of a happy enthusiast. We can well imagine that book-keeping, taught from these books, would become a most attractive subject even to children. The language of the 'Primer' is quite within their comprehension, and the graphic illustrations, such as those showing the meaning of Solvent and Insolvent by differently inclined pairs of scales, page 5, and of Dr. and Cr. by the diagram on page 25, would appeal irresistibly to the young mind.

The method of Mr. Thornton proceeds from the understanding of the ledger to the more complicated transactions for which subsidiary books become necessary. The ledger is the one book always necessary. Others need only be introduced as experience proves them to be serviceable for special purposes.

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The Century Arithmetics. Decimals and the Metric System. London: Blackie and Son.

This addition to the Century Arithmetics opens with a short course of elementary lessons and exercises on the decimal system of notation. Decimal Coinage on the 'Pound and Mil' system is next explained and illustrated by numerous exercises. The systems of coinage used in France and the United States follow, and a full account of the Metric System, with tables and numerous exercises, completes a compact and useful class-book.

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